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Original Articles.

STUDY OF THE OPERATIVE TREATMENT OF OSTEOARTHRITIS OF THE HIP JOINT.

By DR. OZAKI, JAPAN.

I. INTRODUCTION.

THE following report is based upon the study of the end-results of forty cases of operation on the hip joint. The series includes 26 cases of osteoarthritis, ten cases of old tuberculosis, three cases of old congenital dislocation, and one case of old fracture of the neck of the femur. Of the cases of osteoarthritis, twenty-three were diagnosed clinically as "hypertrophic arthritis," and three as "old infectious arthritis." The operations, covering a period of eight years (1908-1916), were performed, with a few exceptions, by Dr. E. G. Brackett, and included two cases of arthroplasty for hypertrophic arthritis, two cases of excision of the head of the femur for hypertrophic arthritis, and one similar operation for old tuberculosis, one arthrotomy for congenital dislocation, and the remaining cases arthrodesis or an Albee operation for artificial ankylosis.

Except in a few cases of polyarticular osteoarthritis, the condition at the time of operation might fairly be considered as a residuum of an arrested or localized process, and the operation was performed only in the case of functional

mechanical damage to the joint, accompanying the pain and other symptoms. In these cases surgical interference, especially a successfully performed arthrodesis, seemed to offer the best method for the relief of the disabling condition.

Before going into further detail regarding the operative treatment, it might be well to mention briefly the progress which has been made up to the present time in the understanding of this disease.

The cause of arthritis deformans has not yet been satisfactorily explained. The disease is multiple and varied in its manifestations, including such wide groups as the gonorrheal, the syphilitic, and the rheumatoid, and those due to faulty metabolism, nervous influences, etc. Pathologically, there are two distinct types, called by Nichols and Richardson the proliferative and the degenerative types. In this treatise we can report a series of twenty-three cases of osteoarthritis of the degenerative type, all except a few showing some hypertrophic overgrowth, the so-called hypertrophic arthritis. Among these cases there was more or less destruction of the articular cartilage and bony overgrowth, and some of the cases showed thickening of the capsule. The cause of the disease was not clearly understood, although in one of the cases the gonococcus fixation was weakly positive. It was not considered that the condition could be ascribed to syphilitic or rheumatoid arthritis, gout, faulty metabolism, nervous influences, etc.; and in some of the cases there were present such causative elements as traumatism, acute suppuration, pyorrhea alveolaris,

dental caries, chronic tonsillitis, constipation, etc.

In general, the causative factors of osteoarthritis have been considered to be traumatism, particularly fractures and dislocations, acute or chronic suppurative infections, gonorrhea, syphilis, probably faulty metabolism, gout, and disease of the central nervous system.

For all of these causative morbid processes, proper treatment should be instituted as soon as possible in the course of the disease, but in the large majority of the cases, when once the arthritic condition has started, the disease progresses with remissions for many years, and up to the present time no treatment has been found effectual.

Among the various methods of treatment which have been tried for the relief of the disease may be mentioned the salicylates, thymus gland, iodide, strychnine or other bitter tonics, iron, cathartics, massage, baking, hydrotherapy, etc.

In December, 1909, Dr. Thorkild Rovsing, of Copenhagen, Denmark, reported his method of injection of sterilized vaseline for the treatment of dry arthritis, which has proved very successful in many cases. The method is simple, and pain, creaking, and stiffness of the joint were relieved in a large percentage of the cases a few days after the operation, although in some there was a reaction with fever, increased pain, and slight swelling. The danger of the operation was embolism of the vaseline and infection, which, however, may be avoided by watchful care. In the hip joint in adults, 20 to 25 cc. of the vaseline was the amount preferred, and in the shoulder and knee, 15 cc., and if the quantity is carefully regulated by the available space in the joint, the undesirable reaction can generally be controlled.

Although this method of treatment has produced a beneficial effect in some of the acute cases, it has not been particularly satisfactory in those cases which have tended to progress intermittently, with an insidious pathological process, characterized by intervals of relief between a series of attacks. It must be borne in mind that it is the duty of the physician to try such methods, or any symptomatic treatment when the sufferer from a chronic disease, such as osteoarthritis, demands this relief.

Sooner or later we may expect to discover the definite etiology of the disease and to solve the problem of its cure, but at present we can only surmise that the disease will be found to be due to various kinds of microbes or to toxic material from other sources in the body; and the discoverer will be either the microscopist or the chemist.

The problem of the cure of the disease is a difficult one, for, although many specific microbes of acute and chronic affections have been discovered, no satisfactory, definite treatment, except in a few cases, has as yet been employed. This is especially true in the cases of chronic

articular disease such as joint tuberculosis and gonorrheal arthritis, where the bacteriology and the accompanying pathological processes are fairly well understood.

Among the many reports of bacteriologic research in arthritis may be mentioned the interesting experimental work on rabbits, reported by Dr. Roades Fayerweather, of Baltimore. This work has demonstrated that the morphological appearances of villous proliferation of the synovial membrane in the knee joints of rabbits, produced by the inoculation of a pure culture directly into the joint (the organisms being isolated from acute polyarticular cases and cultivated on various media), bear little resemblance to the pathological processes of the proliferative arthritis. Although it was clearly stated that cases of the hypertrophic type of arthritis deformans were excluded, it is, nevertheless, a step in discovering the fundamental element of the ideal treatment for the disease.

At the present time syphilitic osteoarthritis can be diagnosed and definitely treated, but for the other types of the disease no therapeutic method has been discovered, so that the best plan to follow is to watch the course of the disease and assist nature in so far as possible. In the progressive cases with remissions, the patients suffer varying degrees of pain and disability. In the degenerative type with hypertrophic changes, complete repair of the damaged joints cannot be expected, although in syphilitic osteoarthritis, with much destruction, it is well known that after a natural bony ankylosis the disease ceases. Hence, arthrodesis is one of the most interesting operations to perform, and the most effective in the relief of the disability, especially in the hip joint.

It must be remembered that operation is only a part of the treatment of osteoarthritis, and that the etiological or general treatment of the case is also important.

Passive motion is contraindicated, as it tends to produce disturbance in the joint and thus hinder the cure. For the same reason, arthroplasty is contraindicated if there is any pathological process on the articular surfaces. Decapitation of the head of the femur may be applicable to cases in which there is immobility of the other hip or knee, in order to restore motion to a stiffened hip joint.

Arthrodesis has been considered the most advisable operation in the monoarticular or traumatic cases.

Dr. Brackett, in an article published in July, 1915, says in regard to the operation: "In general, the operative treatment of osteoarthritic joints is applicable only: (a) when the disease is localized—monoarticular, traumatic; (b) when it is the residuum of a process which has been arrested."

He also stated that the various pathological conditions and the operative procedures best adapted for their relief may be grouped as follows:

Malposition (mechanical strain)	Capsular disease without articular damage	{	Reduction of deformity for joint with good function	
	With articular destruction		Arthrodesis for obliteration of joint	
Hypertrophy of synovial membrane without bone change (rare)	}		Excision of isolated hypertrophic areas	
Osteoarthritic joint with overgrowth	(a) Interfering with normal action. Cartilage and capsule intact. Potential function in joint.	{	Removal of overgrowth	
	(b) Cartilage more or less destroyed, capsule contracted. No potential function.		{	Change in function of joint.

When the above table is compared with the report of cases it will be recognized immediately that the best procedure was applied for the relief of the patient. All the cases were either of long standing or had not been improved by any previous treatment.

Dr. Brackett, in a paper, February 15, 1912, has described the following methods of approach to the hip joint,—the inner route, the anterior route, the lateral route, the latero-posterior route, and the posterior route, and of these, the latero-posterior is the one used most frequently for operation, although the anterior and lateral routes are also used. The latero-posterior route gives the most extensive view of the hip and its surrounding structures, and is, therefore, best adapted in case of operation.

The Latero-Posterior Route. The lateral incision is made from the anterior-superior spine, obliquely downward and outward, to the middle of the outer side of the trochanter, and is then turned downward two inches, in the line of the femur. Especial care must be taken to end the vertical portion well up on the outside of the trochanter ($1\frac{1}{2}$ inches from the tip) and well down towards its posterior border. At the point where the oblique portion joins the vertical, just over the trochanter, an angular incision is made directly backward, two to three inches, down to the fascial portion of the gluteus maximus. After separating the tensor fascia femoris and the gluteus medius, the line of separation is extended downward along the line of the original incision, through the fascia lata, to the femur, freeing the attachments of the muscles (vastus externus) from the outer and upper surfaces of the femur. The fascial expansion of the gluteus maximus is then cut through, along the line of the posterior part of the original incision, and the outer part of the trochanter exposed. The outer and upper surface of the trochanter is then chiseled off by cutting directly backward with a narrow osteotome, and a curved line beginning on the outer surface of the trochanter, $1\frac{1}{2}$ inches below the tip, and cutting inward to the fossa at the junction of the upper part of the neck and the trochanter. This removes the outer portion and tip of the trochanter, and with it the attachments of the gluteus medius, gluteus minimus and piriformis. Care should be taken in the

removal of this piece not to encroach on the neck, or the bone will be weakened at this angle. The portion of the bone removed, with the muscles attached, is deflected backward and upwards, and the muscular covering of the anterior fibers of the gluteus medius and minimus are easily separated from the region above the acetabular rim. The capsule may be split along its upper surface, parallel to the neck, and near to its acetabular insertion cut transversely on each side, which opens the view of the edge of the head and the rim of the upper half of the acetabulum. By rotation of the femur, the extensive opening allows the largest amount of the articular surface of the head to be brought into view, and thus, in operation on the articular structures, the opening gives a freer access than any of the other avenues of approach.

The Anterior Route. The incision, made from just below the anterior-superior spine directly downward five or six inches, exposes the line of division between the sartorius and tensor fascia femoris. At the upper portion, the fibers of the sartorius are nearly vertical, and parallel to the fibers of the tensor fascia femoris, but about three inches below its origin the outer edge of the muscle takes a rather sharp bend inward. The two muscles are easily separated, and this separation must be carried high, nearly to the point of their origin, where the two muscles are closely blended, having their origins much in common. Retracting the sartorius to the inside, the upper portion of the rectus is seen lying in the interval between the two. Retracting the sartorius and rectus to the inside, and lifting at the same time the outer edge of the iliacus, exposes the outer portion of the capsular cavity. Through this opening the anterior surface of the neck and the edge of the head may be brought into view, particularly when the thigh is flexed.

The Lateral Route. This avenue of approach to the hip joint is by the lateral incision described at the beginning of the latero-posterior route. In the center of the operating field is the dividing line between the tensor fascia femoris and gluteus medius.

Arthrodesis. In each case the surfaces remaining on the acetabulum and the head, neck, or upper part of the femur must be carefully refreshed in the way best adapted to meet the

conditions caused by the destructive process. The usual procedure, however, is completely to refresh the upper part of the acetabulum by chiseling or scraping with an osteotome or sharp spoon, then shaping the remaining portion of the head, neck, or top of the femur to fit the refreshed acetabular surface and form a solid bony union.

Suture. After operation, the tissues must be stitched layer for layer with catgut, silk, or silver wire, using catgut for the deep sutures, and heavy silk to secure the muscular attachments to the trochanter, and also for the divided gluteus maximus and occasionally, also for the capsule. The skin may be sutured with silk or catgut. Wire has been used occasionally for holding the detached trochanter in place. For the capsule, the detached trochanter and the divided gluteus, interrupted sutures have always been used, but for the divided fascia, the muscles, subcutaneous tissue and the skin, either continuous or interrupted sutures may be applied.

After-Treatment. After arthrodesis the limb is immediately put up in a plaster-of-Paris spica, in an abducted position, with about 20 to 25 degrees of flexion of the hip and slight flexion of the knee. This spica, which extends from the foot, should include the thigh on the other side.

The patient is kept in recumbency in a long spica for eight weeks. Crutches and a short spica, with no weight-bearing, are used for two months, and crutches with weight-bearing and a bandage spica for one month. Five months after operation the patient may begin weight-bearing without crutches.

These rules, which are for the usual case, naturally do not apply if the union is delayed or does not take place satisfactorily.

II. REPORT OF CASES.

In any case where an operation is contemplated, the occupation of the patient, the family circumstances, the general health, and past illnesses must be taken into consideration. For instance, investigation should be made of the teeth, tonsils, nasopharynx, nasal cavity, gastrointestinal tract, and lymphatic glands, as possible sources of infection. Traumatic causes or any purulent origin of the difficulty should be inquired into, and as early as possible in the course of the disease, the Wassermann, tuberculin, and gonococcus fixation tests should be carried out and bacteriological investigations instituted, in order to determine all possible factors which might influence the plan of treatment. In the present report all the cases considered were of old chronic disease, and mention of negative findings will, therefore, be omitted.

The factors in deciding upon operative interference have been disability of the hip joint, due to deformity, severe pain extending over a long period of time or produced by very slight

motion or exertion, the x-ray appearances, and the amount of destruction found upon opening the joint. The cases in which the operation was considered necessary were those in which rest and mechanical protection failed to bring about relief. In nearly all the cases reported there has been destruction of the cartilage or the bone surfaces, with irregular erosion or overgrowth. Some of the cases have shown permanent distortion due either to the destructive process or to overgrowth following old fracture of the head or neck of the femur. The details of the condition found will be mentioned as the individual cases are reported.

In order that the end-results of the operations might be studied, the patients were asked to return after a certain interval for observation. Seventeen of the cases did as requested, and of these it was possible to take x-ray records of fourteen. Although this is less than half the number of the cases operated on, it is, nevertheless, a sufficient number from which to draw conclusions as to the ultimate outcome of the treatment, and the report of the cases will be carried up to the point to which it was possible to follow them.

III. INTERPRETATION OF RESULTS.

The patients ranged from young adult life to old age, and in the majority of the cases of osteoarthritis they had reached or passed middle age.

The following table gives the average age of the patients at the time of operation, duration of the disease, and age of onset.

CASE NO.	DIAGNOSIS	AGE AT OPERATION	DURATION OF DISEASE	AGE AT ONSET
26	Osteoarthritis	43½ yrs.	5 yrs.	38½ yrs.
23	Hypertrophic arthritis. (Exclude Cases 7, 9, and 11.)	45½ yrs.	5 yrs.	40½ yrs.
10	Tuberculosis	27½ yrs.	12½ yrs.	15 yrs.
8	T. B. of childhood and young adults. (Exclude Cases 28 and 35.)	23½ yrs.	14½ yrs.	9 yrs.
3	Congenital dislocation.	13 yrs.	9 yrs.	4 yrs.

Indications for Operation. All the cases operated upon had a decided degree of disability, due either to repeated attacks of the difficulty or to constant pain, progressive stiffness, or deformity of the hip joint. All the cases except six (Nos. 7, 8, 11, 19, 25, and 27) suffered from pain and stiffness, and these six cases requested operation for the correction of deformity or the reduction of dislocation. There were six cases for the correction of deformity, of which four were cases of osteoarthritis and two were cases of tuberculosis. There was one case of reduction of dislocation for neglected congenital dislocation of the hip. Among the cases in which there was practically no pain, Case 7 repre-

sented an osteoarthritis, in which the acute symptoms had subsided, Case 33 a congenital dislocation, and Cases 22 and 25 were tuberculosis, with some progression of the disease, but with no complaint of pain at the time of the operation.

The operation was performed in both monarticular and polyarticular cases. Among the cases of osteoarthritis, there were 16 monarticular and 10 polyarticular; among the tuberculous cases, 8 monarticular and 2 polyarticular.

In respect to a history of trauma, this was noted in three cases of monarticular hypertrophic arthritis (Cases 7, 14, and 16), in three cases of polyarticular hypertrophic arthritis (Cases 3, 13, and 17), in two cases of monarticular tuberculosis in elderly men (Cases 28 and 35), and in one case of polyarticular tuberculosis (Case 22).

In the polyarticular cases various joints were involved. In undertaking any operative procedure it was always necessary to consider the possible involvement of the other joints,—hips, knees, ankles, and spine,—on account of their relation to the function of the joint after operation. In the cases of hypertrophic arthritis, Nos. 3, 5, 13, 36 and 37 were associated with some trouble in the other hip; Cases 1, 2, 6, and 17 were associated, respectively, with involvement of the ankle on the other side, with the knee on the other side, with both knees, and with the knee on the affected side. Cases 13 and 21 had some spinal involvement. Case 22 (tuberculosis) had involvement of the knee on the unaffected side, and Case 24 (tuberculosis) had involvement of the knee on the affected side.

At the time of operation the function of these associated joints was not particularly disturbed, except in Cases 5 and 22, although limitation of motion existed in almost all of the cases, and some of the cases had crepitus, without pain. In Case 5, for which an arthrodesis was performed, the motion of the other hip joint was moderately limited, and seven months after the operation an arthrotomy was required for the relief of this. An ankylosed knee on the unaffected side of Case 22 was not considered a contraindication to arthrodesis of the hip.

Evidence of the pathology of the joints was obtained by radiographs and the operative findings. In the cases of osteoarthritis, more or less destruction of the cartilage and bone, overgrowths in the form of exostoses, lippling of the acetabular rim, or diffuse covering of the head and neck were found in almost all of the cases, placing them clinically in the so-called hypertrophic arthritic class. Case 11 (an old infectious process) showed unusual destruction, with the absence of the head of the femur, and posterior-superior dislocation. In Case 5, in which a fracture of the neck of the femur occurred in flexing the thigh at operation, the bone was very spongy and friable. This bony change is noteworthy, although it occurred in only one case. The change in the shape of the head, "mush-

rooming," and in the neck, "coxa vara," appeared in a few cases, and there were three cases of bony ankylosis.

Capsular thickening appeared in Cases 3, 6, 7, 10, 18, 36, and 38, and capsular adhesion to the neck in Cases 2, 7, and 21. In the infectious case, No. 9, the capsule was obliterated and the periarticular tissues showed extensive inflammatory changes. Fluid in the joint cavity was found in only one case, No. 3, and the amount was very small.

In the cases of tuberculosis, specific destructive processes of the bone, especially the head of the femur, were present in all the cases, and a few cases showed total absence of the head and pathological involvement of the neck. In all the cases except two (Nos. 24 and 28), the acetabulum was also involved, and in Case 29 the acetabulum was obliterated by the reparative process. The acetabulum in Case 26 was shown in the x-ray to be very shallow. In Cases 22 and 28 there was capsular thickening; in Case 28 capsular adhesion. In Case 30, which was a second operation, the capsule was found to be partly diseased and there was a large pocket of tuberculous material between the layers of the muscles. Case 35 had extensive periarticular induration with many foci of tuberculous pus.

In Case 31, old fracture of the neck, the x-ray showed an inward prominence of the acetabulum, with partial destruction, which increased a little after operation. At operation the neck of the bone was found to be soft and spongy, the capsule thickened and adherent to the neck, and the difficulty, which had existed for seven months, was probably, therefore, due to some inflammatory process such as an osteoarthritis.

Absorption of the femoral head was found in two cases of unilateral congenital dislocation (Nos. 32 and 34). In Case 34 the head of the femur was dislocated above and behind the acetabulum, but in Case 32 the head remained in the acetabulum, which had changed in depth and width, and in both cases there was a small, loose piece of bone detached from the head of the femur, which seemed to be the cause of the trouble. Case 33 was a bilateral dislocation, with more trouble in the left hip than in the right. At operation the capsule was found to be contracted into the form of an hourglass between the acetabulum and the head of the femur, and the head was separated and loose at the epiphyseal line. X-ray of the right hip showed new acetabular formation in good condition above the old acetabulum. Practically, the leg had moderate function.

After-Course of Operation. In the 21 cases of osteoarthritis in which an arthrodesis was done, the after-course of the operation was very simple. In regard to the duration of the after-treatment for the operated hips, the time varied from three to twelve months, with six months as an average. (Case 6, three months; Cases 8, 9, 10, 11, and 19, four months; Cases 1, 2, 3, 7,

12, 20, and 21, five months; Case 16, six months; Cases 5 and 13, seven months; Cases 4 and 8, eight months; Cases 14 and 15, ten months; Case 17, twelve months.) In Cases 4 and 9 the wound was purulent. Case 4 healed after eight months, and Case 9 still had a slightly discharging wound at the end of four months, although the hip was solid and without pain.

At the end of treatment there was more or less improvement in all the cases, moderately good or excellent functional results, and pain was present in only two (Cases 15 and 16), the former having slight motion and pain after eight months, continuous fixation in a plaster spica producing no effect, and the latter having pain on weight-bearing and some instability of the hip six months after the operation. Cases 2 and 18 represented a second arthrodesis, pain and slight motion in the hip existing, respectively, five months and seven months after the first operation. In Case 4 the functional result in the hip seemed to be retarded by the fact that the knee on the other side was affected and required treatment for seven months after the trouble in the hip had been eliminated.

Decapitation of the femoral head for osteoarthritis was done in Cases 36, 37, and 38. The results in Case 37 was the same as in an arthrodesis, with solid union of the hip and no pain six months after operation, although the operative wound suppurated for five months. One month after operation some degrees of painless motion were restored in Case 36. Five years ago, excision of the exostosis over the hip on the other side was performed, with the restoration of a great deal of motion, which has been very well maintained since. In Case 38 the wound suppurated, and fifty-eight days after operation the patient died from streptococcus septicemia.

Excision of the overgrowths or arthroplasty was done in Cases 39 and 40. The former, one month after the operation, was able to walk with the aid of a cane and had Zander treatment for a long time, but the final result of the case is unknown. The latter followed the normal course of an arthrodesis, with apparently no motion in the hip after three months, and excellent function four months later.

An arthrotomy was performed in Case 4, followed by the death of the patient from anemia six hours later. This occurred seven months after a very successful arthrodesis of the other hip.

In these 26 cases of osteoarthritis, two had a second arthrodesis, two had operations on both

hips, two of the cases of arthrodesis did not have ankylosis of the hip, and two of the cases in which there was no arthrodesis had ankylosis. Arthrodesis was performed twenty-three times in 21 cases, with 19 successful results. Apart from arthrodesis, there were seven operations performed on six cases,—two of the cases with ankylosis of the hip, one of them having an excellent result, two cases in which it is impossible to report the ultimate result, but probably it was without effect, and two cases which died. It can be seen in the light of these figures that the final result of arthrodesis was good, and that the results of the operations for the restoration of motion in the hip varied considerably, with lack of success in the greater number.

End-Results. Of the 9 patients who returned for observation of the end-results of operation on the hip, 7 were of arthrodesis. Examination showed that in 8 of the cases (Nos. 10, 13, 14, 17, 18, 21, 37, and 40) there was solid ankylosis of the hip, with a fairly useful position of the leg. Case 37, excision of the head of the femur, and Case 40, excision of the overgrowths, showed the normal operative course of an arthrodesis. X-rays of five cases (Nos. 10, 17, 18, 21, and 40) showed bony ankylosis, but in the x-ray of Case 37 the bony union was doubtful. Cases 13, 17, 18, and 40 had good health and excellent function of the leg. Cases 14 and 38 were not so active, but this was probably due to the advanced age of the patients. In Case 10 the patient was incapacitated by trouble in the other hip and lower back. Case 21 required continuation of the treatment before the final result could be told with certainty. In Case 16, which had no deformity, there was no pain on walking or motion of the joint. Two months after the operation, 110 degrees of flexion and a few degrees of motion in all directions were possible.

The following table gives details in regard to these nine cases in which the end-results were observed.

Of the eight cases reported above, the only one complaining of any trouble in the ankylosed hip was Case 17, who had occasional pain in the buttock, probably due to a neuralgia unconnected with the process in the hip, because the gluteal muscles showed marked atrophy and the patient was able to walk long distances.

From the observation of the above end-results of an arthrodesis for osteoarthritis, in which a solid serviceable hip was secured for the patient at the end of an average period of seven months, or one month longer than the average period for the whole group of cases, we may suppose that

NO. OF CASE	10	13	14	16	17	18	21	37	40	AVERAGES
	Mos.	Mos.	Mos.	Mos.	Mos.	Mos.	Mos.	Mos.	Mos.	
Duration of operative treatment.	4	7	10	6	12	8	5	6	7	Mos. $\frac{2}{3}$
Duration from operation to end-result.	53	41	37	35	20	17	-	46	26	2 yrs. 10 mos. $\frac{2}{3}$
Duration without treatment.	49	34	27	20	8	9	-	49	19	2 yrs. 2 mos. $\frac{1}{3}$

in the other cases in which the patient left the hospital with a solid hip in good position, the functional result was also probably good.

The shortening of the leg in eleven cases of arthrodesis is shown in the following table.

No. of Case	10	11	13	14	16	17	18	19	21	37	40
Inches shortening before operation	0	7	0	0	2½	½	0	0	0	0	0
Inches shortening after operation	1¼	2½	¼	0	2	½	0	¾	1	0	0

In Case 11 the shortening was reduced 4½ inches by the operation, due to the change in position, and in Case 16 the result would have been better had the arthrodesis been successful. The shortening resulting from the arthrodesis was very slight or nil if the bone changes in the head and neck, such as destruction or coxa vara, were slight.

The operative after-course in the tuberculous cases was very different, although the operative wound healed normally in all the cases except Case 24, in which there was a small amount of discharge from a point in the scar. In nine of the ten cases arthrodesis was performed, and in the tenth (Case 35) decapitation of the head of the femur. Case 22 had a solid hip four months after operation, and three years and two months later solid ankylosis was observed, but function of the legs was prevented by an ankylosed knee on the other side. In Case 23, which was a second arthrodesis, the hip was ankylosed six months after operation, and one year and nine months later the hip was solid and without pain, and the patient could walk without support. In Case 24, an x-ray taken fifty days after operation showed good bony union. An x-ray taken four months after operation in Case 25 showed good bony ankylosis, and two months later the leg was in good condition. Arthrodesis was unsuccessful in Case 26, and the patient complained of almost continual pain in the hip. In Case 27, two months after the operation, a tenotomy of the adductors was performed because their contraction seemed to cause pain in the hip, and five months later there were a few degrees of motion in the hip, and very little pain. The general condition of the patient, No. 28, was excellent, and although the hip seemed to be firm, the plaster was continued. In Case 29, in which there was painless motion of the hip, fixation in a plaster spica was continued. Case 30 was a second arthrodesis, and one year after the operation the hip was ankylosed in good position. In Case 35, the hip, four months after operation, was in good condition, with very little motion.

End-Results. Of these ten patients, the end-result was observed in six. The position of the legs remained good except in Cases 25 and 35. An excellent functional result was secured in Case 23, but in the interval of two years and

one month in which there was no treatment a few degrees of painless motion reappeared. This case was observed four years and four months after operation. Case 25 could walk without any support, but the leg was held in faulty position and there was a slight amount of painless motion in the hip. The x-ray, as compared with one taken a year and a half previously, showed progressive destruction. The case was observed a year and ten months after operation. In Case 26 the patient had motion in the hip, accompanied by some pain, and treatment was continued for a year and eight months after operation. Case 27 went without treatment for two months, but the hip became stiff in good position, with moderate function of the leg. The patient was in good general condition. At the end of seven months after operation the x-ray showed some question as to bony ankylosis. In Case 30, one year and two months after operation, the hip had been solid for two months, but the general condition of the patient was rather poor and she used crutches.

In the above-mentioned five cases, the operative end-results of Cases 23, 27, and 30 were good. In the other four cases, arthrodesis was successful in Case 22 and had held for three years and two months. Cases 23 and 30 were a second arthrodesis, so that in these four cases six operations were performed, with a successful outcome in three.

It is difficult to predict the end-results of Cases 24, 28, and 29, because these cases were under treatment for a period of only two to five months, and it must be borne in mind that the insidiously progressive destruction will take place even after a bony ankylosis, such as occurred in Case 25.

In the case of excision of the head of the femur (Case 35), there were sinuses, a peri-articular inflammatory process, and faulty position of the leg, but the general condition of the patient remained good. This result was observed two years and two months after operation, and would seem to be a very unsuccessful outcome, but in this case the disease was allowed to take its natural course on account of the peri-articular inflammation and the many foci of pus found at the time of operation. A year and a half after operation a sinus developed, and it was not considered wise to interfere with the natural cure of the disease.

Case 31, old fracture of the neck of the femur, progressed normally after the arthrodesis, and eight months later the hip was solidly ankylosed in good position, with an excellent functional result in the leg. It is now four years and one month since the operation.

For the three cases of old congenital dislocation, arthrodesis was performed in two and arthrotomy in one. Ankylosis resulted in all: in Case 32 after two years, in Case 33 after eleven months, and in Case 34 after three years and five months. In Case 33 some motion reappeared in the hip after a year, and caused

trouble in walking. The end-result in Case 32, observed two years and five months after operation, showed the patient with an active leg, although the hip was in rather faulty position. Case 34 probably had a serviceable leg, and in Case 33, if the hip has again grown solid, the result must be good. In these non-tuberculous cases, with one hip free from difficulty, a serviceable leg may be confidently expected.

Faulty position of the leg after ankylosis was found in two cases. Case 19 had a firm hip in 45 degrees of flexion and slight adduction, which was just the same amount of flexion as before operation. In Case 32, the hip was held solid in 55 degrees of flexion and a few degrees of eversion, but this malposition in flexion of the leg was compensated completely by the lordosis of the lumbar region, so that the patient could lie with a straight leg and had no difficulty in walking or sitting down. It is not clear whether the faulty flexion in the first case was as well compensated for, because the patient was not as young, but a letter from him contains the following statement: "In regard to my condition, I would say that my leg on which I had the operation does not bother me, although it is not so strong as before." This patient was 24 years old, and the age of Case 32 was 14 years.

CONCLUSIONS.

In monarticular, non-tubercular cases it is always possible to relieve the disability of the leg by an arthrodesis, which can be repeated, if necessary.

In polyarticular cases, if both hips are involved, the motion in one of the hips must be restored by some such operation as deapitation of the head of the femur.

In cases of tuberculosis definite relief cannot be expected to the same degree as in osteoarthritis, but the operation has produced no bad effect on the general or local condition, and has given marked benefit in the majority of the cases.

Arthrodesis has appeared to be especially beneficial in cases which have arrived at a stage of disability where the patient is demanding a more serviceable leg. The leg will be stronger and less troublesome after the operation, and hence arthrodesis is the operation of choice in cases where only one hip is involved. If an operation is required to restore motion in a joint, careful judgment must be used. In Case 16, in which the osteoarthritic affection was supposed to have subsided, it was thought that motion could be restored to the joint by a total excision of the head of the femur. If partial excision were the method chosen, it would be necessary to apply some protection against bony and capsular adhesions, and for this purpose the best material is furnished by free flaps of the deep fascia of the thigh, according to Dr. M. Sumita of Fukuoka, Japan, who in the year 1915 reported over eighty excellent results of

various joints. This method will be successful if the refreshed bone surfaces are free from pathological processes.

To Dr. E. G. Brackett, of the Massachusetts General Hospital, in whose Orthopedic Department this work was carried out, I am grateful for much assistance and friendly courtesy. The kindness of Dr. Z. B. Adams in advising me about the observation of the cases is gladly acknowledged.

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OBSERVATIONS ON THE TREATMENT OF MYELOCYTIC LEUKEMIA BY RADIUM.*

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RENON, DEGRAIS and their associates (1910) were the first to treat myelocytic leukemia by means of radium exposures over the enlarged spleen. In 1913 they reported five cases. In the first case satisfactory remissions were obtained with five series of exposures over a period of two years. Death occurred two years and two months after the first treatment. In the case of their second patient, a satisfactory result was obtained over a period of nine months with two series of exposures. Death occurred twelve months after the first treatment. Two patients were in good condition six months after their first treatment. The fifth patient had been splenectomized prior to the use of radium, a 2800 gm. spleen having been removed. Following the splenectomy, the leukocytes fell to 27,000, but subsequently rose to 143,000. Benzol was used without apparent effect. The splenic area was then exposed to radium, and this procedure was curiously followed by a reduction of the leukocytes to 21,500. It was not noted by the authors that the reduction may have been a late effect of benzol; it may, on the other hand, have been due to the direct effect of radium on the large amount of blood in the abdominal cavity. Radium was next applied over the thighs, but the leukocytes rose to 81,600. Radium had been applied over the thighs in one other case of this series without favorable result.

Renon and Degrais mentioned that twelve patients had been treated by other French observers with the initiation of favorable remissions.

* Presented before the Association of American Physicians Atlantic City, May 2, 1917.

In the English literature a few cases have been reported in which radium exposures were followed by remissions. Similar results have been obtained by Peabody and by Burnham in this country in a large series of unpublished cases.

In May, 1916, before the Association of American Physicians, Ordway presented a complete and instructive discussion concerning radium therapy in myelocytic leukemia, and placed on record a detailed study of one of his cases in which a remarkable remission had been brought about by means of radium emanations. In this case the patient had been formerly resistant to both the roentgen ray and benzol. Death occurred, however, fifteen months after the recognition of the disease.

The results of these various observers lead only to the conclusion that it is important to make use of this method of treatment, when possible, in order to initiate a remission in a disease with so unfavorable a prognosis. Our own experience from May 15, 1916, to April 1, 1917, comprises a series of thirty consecutive cases of myelocytic leukemia which have been treated by means of the surface application of radium element over the spleen.

Method of Application. In some instances in this series we used 50 mg., and in others 100 mg. of the radium element in tubes. The enlarged spleen was mapped out into squares in the manner described by Ordway, and the radium exposed over each area for periods of three or four hours. The total length of time for each series of applications varied from twelve to forty-eight hours; usually, however, the time was from twenty-four to thirty-six hours. Patients remained in bed during exposure. In the early cases the protection consisted only of 2 mm. of lead beneath the radium and 2 mm. of lead over the radium. The radium was held in place by means of adhesive plaster. Superficial burns resulted, but they were never serious and healed without difficulty. As previously pointed out by Ordway, our experiences demonstrated that the skin formerly traumatized by adhesive plaster was especially susceptible to burn. After adding $\frac{1}{2}$ inch of wood beneath the 2 mm. lead screen we obtained results equally satisfactory, with only occasionally a slight burn. The radium may be raised so far from the skin by means of gauze that little result is obtained from the exposures. When a satisfactory response does not occur we reduce the protection, even to the point of burning the patient. Dr. W. J. Tucker, working with me, devised a biscuit-shaped block which has been used routinely for several months. This consists of $\frac{1}{2}$ inch of wood, 2 mm. of lead, $\frac{1}{4}$ inch of wood bored to receive the tubes of radium, and above this 2 mm. of lead and another $\frac{1}{2}$ inch of wood. The block is held in position by means of a simple canvas belt. An endeavor is

made to concentrate the fire through the most massive portions of the spleen.

Clinical Experience. For convenience of presentation, our thirty cases have been classified with respect to the size of the spleen at the time of the original examination. The degree of splenic enlargement is denoted by the Scale 1-4. Scale 4 represents a spleen of enormous size, extending beyond the midline and into the right iliac fossa, practically filling the abdomen; Scale 3, a spleen the edge of which extends well to the right of the navel; Scale 2, a spleen extending beyond a point midway between the costal edge and the umbilicus; and Scale 1, a spleen which is easily palpable or which extends only a couple of inches from the costal edge. Splens having unusual contour or position have been represented by their approximate equivalents in this scale.

TABLE I.

MYELOCYTIC LEUKEMIA—RADIUM TREATMENT.

SPLEEN—SCALE 1. (SLIGHTLY ENLARGED)					
NUMBER	PAROTIS LAB.	PAROTIS MENT.	SIZE OF SPLEEN	TIME BETWEEN TUBES	NO. HOURS
12,900	12,900	11.0	3.800	1 to normal	46 days
12,574	12,574	19.0	4.000	1 to normal	39 days
12,558	12,558	27.7	12.840	1 to normal	40 days
207,000	207,000	20.7	8.400	1 to normal	40 days
192,875	192,875	20.7	8.400	1 to normal	61 days

exposures, a total of 3600 mg. hours, over a period of forty-three days, all hemorrhage ceased, the patient's general condition improved remarkably, the leukocytes were reduced from 142,000 to 9800, and the spleen was considerably smaller. It has been repeatedly noted following radium treatment that the hemorrhages cease when the condition of the patient becomes improved. A very rapid improvement and reduction of the leukocyte count occurred in one patient (170257), in whom, after one series of exposures, 1800 mg. hours, the leukocyte count became reduced in ten days from 389,000 to 29,900.

TABLE IV.
MYELOCYTIC LEUKEMIA—RADIUM TREATMENT.

SPLEEN—SCALE 4. (HUG.)									
NUMBER	PREVIOUS LEB-ROCKEY COUNT	PREVIOUS MYELOCYTE PERCENTAGE	PREVIOUS NEUTROPHILIC COUNT	PREVIOUS LEUCOCYTE COUNT	PERCENTAGE	REDUCTION IN SIZE OF SPLEEN	TIME BETWEEN COURES	NO. HOURS	NUMBER OF TREATMENTS
175,701	918,000	25.7	19,600	13.0	4 to 1	4 to 1	31 days	8,300	5
162,866	290,000	25.0	0	0	4 to 1	4 to 1	57 days	5,300	3
175,538	773,000	35.0	25,000	3.7	4 to 1	4 to 1	75 days	7,700	5
190,469	604,000	28.3	5,000	7	4 to 1	4 to 1	46 days	10,000	6
176,084	215,000	16.3	8,200	4.3	4 to 1	4 to 1	23 days	4,600	3
168,742	16,400	17.0	4,200	4.3	4 to 1	4 to 1	33 days	7,500	1
175,480	470,000	32.3	157,000	10.3	4 to 3	4 to 3	105 days	4,500	7
166,824	644,000	43.0	30,400	34.7	4 to 3	4 to 3	90 days	4,350	3

There were 8 patients with spleens in the Scale 4 group (enormous spleens). The most remarkable results were seen in some of the cases of this group. In 4 of the 8 patients, the spleen became reduced from Scale 4 to Scale 1 in from twenty-six to seventy-five days after from three to six series of exposures, totaling from 4600 to 10,000 mg. hours. In the remaining 4 cases there was a very considerable reduction in the size of the spleen and in the leukocyte count, in spite of the fact that 2 of the patients were in *extremis*, and no results would ordinarily have been expected from treatment. In one instance in this group the leukocyte count was reduced from 918,000 to 19,600 in thirty-one days after five series of exposures. In another instance the leukocyte count was reduced from 773,000 to 25,000 in seventy-five days after five series of exposures. In this latter patient the reduction of the spleen was remarkable.

Another patient of this group (168742) presented a satisfactory history for leukemia, while the leukocyte count was only 16,400, of which 17% were myelocytes. It is apparently not of rare occurrence to observe in myelocytic leukemia a huge spleen without extreme leukocytosis, the case being of more chronic type with longer history; this type of case is apt to show a less marked remission as the result of radium treatment.

It is not possible, without extended discussion, to follow in detail the individual cases of the series; however, the temporary effect of the treatment by radium exposures has been demonstrated. The ultimate results cannot be summarized at this time, but there is no reason to believe that the effect will be other than temporary. In 14 of the 30 cases, after a marked reduction of the size of the spleen had been brought about by means of radium, splenectomy was done without operative mortality. The postoperative course of these cases cannot be satisfactorily discussed at present.

The Differential Count. The reduction, not only of the absolute number, but also of the relative percentage of myelocytes, is most striking after radium treatment. As a less extreme and quite representative example, one instance (168742) may be cited in which the myelocytes fell from 29.7% of 329,000 cells to 2.3% of 7000 cells, or from approximately 98,000 cells to 140 cells. It has always been possible to find myelocytes in the smears, on prolonged search, though they have occasionally been absent on the routine differential count.

The reduction of the number of neutrophilic polynuclears is also striking. The relative percentage remains approximately the same before and after treatment. But the reduction of the absolute polynuclear count is very great; for example, in the case previously cited, a reduction from 57% of 329,000 cells to 70.7% of 7000 cells, or from approximately 187,000 cells to 5000 cells.

Although the relative percentage of small lymphocytes increases after the reduction of the leukocyte count, there is, nevertheless, a reduction of the absolute count to approximately one-tenth of the original number of cells. The relative percentage of large mononuclears increases after treatment, but some of these are, without doubt, myeloblasts.

Reactions Following the Use of Radium. The immediate reactions of radium treatment in the series have been infrequent and mild. Large doses have not been used, and in most instances the series of exposures has been of short duration. Only once did vomiting occur, and it was not severe. In 6 instances there was more or less complaint of nausea with weakness; in 2 there was headache, and in 1 there was quite a persistent complaint of backache.

Radium is a powerful element, and it is necessary to study carefully the results of treatment in order to avoid over-exposure and pos-

sible harm. Repeated applications of radium once a week for several weeks may initiate a severe anemia with leukopenia. If the red blood cells fall below 2,500,000, transfusion should be considered and radium treatment temporarily discontinued. When there is reduction of the spleen and reduction of the leukocytes, one's enthusiasm may lead to over-application. As a rule, we have been content to have the leukocytes fall to 20,000 or 15,000 cells. With a definite leukopenia, there seems to be much more likelihood of the occurrence of a crisis with severe anemia and hemorrhage. The anemia may then simulate the primary type, with normoblasts and megaloblasts present. We have noted a temporarily increased fragility of the red blood cells shortly after radium exposure. It is also probable that there is a reduction of platelets after excessive radium treatment. We have learned quite definitely the necessity for the timely use of transfusions in connection with radium treatment. In general, as patients with leukemia approach a serious condition, severe anemia develops. If this anemia can be combated by means of transfusion, life may frequently be prolonged.

Improvement in the General Condition. The improvement in the general condition in some instances is nothing short of remarkable, even after one or two series of exposures. The appetite returns, the toxemia becomes ameliorated, and the strength rapidly increases. The improvement in the general condition does not seem to be the result of a rapid improvement of the anemia, but is probably due to a reduction of the toxemia and leukocytosis and an increase of appetite. Very marked improvement of the general condition is frequently seen with only slight improvement of the hemoglobin and red cell count. A gain in weight results, in spite of the rapid reduction in the size of the spleen. A certain degree of improvement occurred in all the 30 patients treated. In 26 there was marked improvement, and in 13 of these, a very remarkable improvement.

Cases in Which the Anemia was Not Improved. There were 5 patients in whom, at one time or another during the course of the radium treatment, a definite improvement in the hemoglobin and in the red blood cells did not occur. Three of the 5 were in extremely bad condition. One was so ill that after one treatment radium was discontinued. Another was a severe bleeder and was very resistant to treatment, although the bleeding finally ceased and general improvement occurred without transfusion. The third responded fairly well to a first series of exposures, but returned in a few weeks with severe anemia and ascites. The remaining 2 of the 5 patients with severe anemia were examples of the results of long-continued exposures. Leukopenia and severe anemia, together with a petechial eruption and epistaxis, developed. Transfusions were resorted to, and the

patients are both now in very good general condition.

Hemorrhage. The effect of radium exposures on hemorrhage in myelocytic leukemia is important. It can be definitely stated that hemorrhages have very promptly ceased after improvement has been initiated by means of radium. Fourteen patients gave a previous history of hemorrhage. In many instances bleeding had followed the extraction of a tooth. Epistaxis was a more common form of spontaneous hemorrhage. Purpura, petechiae and melena also occurred. In only two instances did hemorrhage follow radium treatment when it had not occurred previously. In all of the other hemorrhagic cases the hemorrhage ceased after the first, second or third exposures. One patient, who was a very severe bleeder, ceased to bleed after two series of exposures. The two patients who bled only after radium treatment had developed a severe anemia and a leukopenia, and hemorrhages were slight; in one instance epistaxis, and in the other petechiae over the legs. Transfusions were immediately resorted to, with satisfactory results.

SUMMARY.

1. Thirty consecutive cases of myelocytic leukemia were treated by means of the surface application of radium element over the enlarged spleen. A dosage of 50 and 100 mg. was used. The protection finally adopted was 2 mm. of lead and $\frac{1}{2}$ inch of wood. The splenic area was mapped out into squares after the manner described by Ordway, and the radium was applied over each square for from two to four hours, with a total exposure, usually of twenty-four or thirty-six hours. The exposures were repeated every week until a satisfactory remission was obtained.

2. A certain degree of general improvement, together with reduction of the size of the spleen and of the leukocytic count, occurred in every instance, even in the most advanced and toxic cases. Marked temporary improvement occurred in 26 patients, and a remarkable improvement in 13. It is impossible satisfactorily to discuss the subsequent histories of these cases at this time.

3. Hemorrhage ceased as a rule after one or two series of exposures. In two instances, hemorrhage occurred after radium exposures when it had not occurred previous to treatment. In these instances the hemorrhage seemed to be the result of over-exposure; an anemia also developed; both the hemorrhage and the anemia were successfully combated by means of transfusion.

4. In 25 patients there was definite improvement of the anemia concomitant with the improvement of the general condition. The reduction of the number of leukocytes was due chiefly to not only an absolute but also a striking relative fall in the myelocytes; there was a striking fall in the absolute count of polynuclears, while

their relative percentage remained approximately the same. There was also a marked fall in the absolute count of small lymphocytes.

5. Surface exposures of radium over the spleen of myelocytic leukemia usually effect a very rapid reduction of the size of the spleen, a fall of the leukocyte count, improvement in the general condition and, together with transfusion, constitute at present the most effective temporary measure in the treatment of the disease.

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LYMPHOCYTOSIS: A CLINICAL STUDY FROM GROUP DIAGNOSIS.*

By J. MARION READ, M.D., SAN FRANCISCO.

AN increase in the lymphocytes of the blood stream is a sign frequently met in clinical medicine and, in a certain percentage of cases, is not satisfactorily explained. Keeping in mind the warning of Galambos,¹ that the diagnostic value of lymphocytosis should not be too highly regarded, this article will review the subject briefly and give some impressions gained from the data of the Diagnostic Section of St. Luke's Hospital Clinical Club.

The lack of consideration which a lymphocytosis receives at times is, in part, accounted for by the great number of pathologic states in which it is present. Because of this fact, the field of differential diagnosis is considerably widened if one tries to fit this blood-finding into the clinical picture. Ofttimes it is a part of some minor, concomitant disease, and thus its existence is accounted for.

A consideration of lymphocytosis from the viewpoint of group study² should yield some interesting information, because this type of clinical investigation is concerned with the unearthing of every pathologic condition which a patient harbors. Under such a system, every abnormal sign finds its place, or the investigation is continued until the clinical picture is clear. In the work of the Diagnostic Section, the occurrence of lymphocytoses which were often difficult to explain has suggested a review of the subject and a summary of those cases which showed this picture.

Upon looking through the literature to ascertain the physiologic and pathologic conditions characterized by an increase of the lymphocytic elements in the blood, it is soon revealed how varied and apparently unrelated these conditions are. It is possible, however, to divide all

of them into two groups, according to the mechanism of their production.

One form, which shall be designated as Type I, is a true lymphocytosis marked by hyperplasia of the lymphatic structures of the body, with an actual increase in the total number of large and small lymphocytes.

The other form, to be referred to as Type II, is a pseudo-lymphocytosis, and is produced by a mechanical forcing of the preformed cells into the general circulation from their recesses in the spleen and other lymphatic structures. This is not marked by an actual increase in the total number of mononuclears in the body and is only transient in the greater number of cases.

Before naming the various states accompanied by the blood finding under discussion, mention should be made of the experimental lymphocytosis produced by the injection of such vasoconstrictor substances as adrenalin,^{3,4} muscarin, pilocarpin and barium chloride. Harvey⁵ showed that this was purely mechanical and produced by contraction of the arterioles of the spleen, which was actually reduced in size. Thus there is experimental basis for the belief that many lymphocytes are of the Type II described above.

There are four physiologic states marked by a mononucleosis:

1. In infancy and childhood,⁶ the spleen, thymus, tonsils and lymphatic structures in general are large and active, with a consequent increase in the lymphocytes even to half of the white cells.⁶ Children respond quickly with a rather high lymphocytosis to many infections and abnormal conditions, which in adults are accompanied by little or no change in the blood picture. It is quite likely that to this fact can be attributed many of the lymphocytes which have been observed to occur in measles, scarlet fever, mumps, anterior poliomyelitis, ringworm, and other diseases more prevalent in childhood.
2. Attitude has been shown to be a cause of lymphocytosis by Bar and Engelmann⁷ in Germany, and Stains, James and Rosenberg⁸ in this country. The mechanism of this increase is most likely that of Type II.

3. The ingestion of fat and carbohydrates seems to call forth lymphocytes. Rous⁹ has shown an increased output of mononuclears from the thoracic duct after the administration of glucose, and maintains that the number of hyaline cells in the blood is materially increased through this mechanism. But, as another possible explanation, we have Bergel's¹⁰ demonstration of the chemotaxis which exist between lymphocytes and lipid substances in the blood.

4. A sudden mononucleosis occurs after exercise, the absolute number even being doubled in some cases.¹¹ This mechanism is, of course, that of Type II.

The numerous pathologic states characterized by an increase of the hyaline cells can, for the purpose of study, be grouped with considerable advantage.

* Read before the Medical Section of the San Francisco County Medical Society, April, 1917.

The infections form one class which can be subdivided on the basis of lymph gland involvement.

1. Certain cases of tonsillitis and acute adenitis show marked mononucleosis instead of the usual polynuclear increase.¹¹

2. Tuberculosis of the lymph glands¹² shows lymphocytic increase in the early stages before widespread destruction occurs, after which lymphopenia often ensues.

3. In syphilis, during the period of lymph gland involvement, a mononucleosis is characteristic, and this is often associated with eosinophilia. Congenital syphilis has been said to cause a similar picture.¹³

4. Lymphocytosis has long been regarded as pathognomonic of pertussis,¹⁴ and has been attributed by Ehrlich to involvement of the peribronchial glands. But Meunier¹⁵ pointed out in 1898 that the increase is greatest during the period of paroxysms, and this has since been substantiated by many writers. This would indicate that it is of Type II rather than Type I.

There are reported in the literature many disease conditions accompanied by an increase of the hyaline cells in conjunction with a leukopenia. But, as mentioned by Catton,¹⁶ nearly every leukopenia is characterized by a relative increase in the lymphocytes—in other words, the decrease is in the polymorphonuclear cells. In this connection, there should be mentioned an essential difference in the mechanism of true lymphocytosis and polymorphonuclear leukocytosis. The former seems to be dependent upon stimulation of lymph glands, while the latter is an expression of chemotaxis.¹⁷ The two, therefore, do not stand in a reciprocal relation. The non-granular cells are more constant in their number and not subject to the sudden and marked variation of the polymorphs. In fact, the lymphocyte seems to be a cell which is more essential for the maintenance of the body functions than the granular cell. The high percentage of nuclear as compared to cytoplasmic material also speaks for its functional capacity and importance. It is easy to understand, therefore, why the lymphocytes are retained and the granular cells sacrificed in the leukopenias, especially those which occur in debilitated states. One patient on the Diagnostic Section, who had starved himself for some time, had only 2200 white cells, and 70% of these were lymphocytes.

The most typical example of lymphocytosis and leukopenia among the infectious diseases is typhoid,⁵ in which, during the third to sixth week, the hyaline exceed the granular cells. This so-called "crossing of the leukocytes" is regarded as having considerable prognostic value, for, in unfavorable cases, it does not occur. Glinchikoff¹⁸ found an increase in lymphocytes during vaccination against typhoid.

Tuberculosis, which frequently shows a leukopenia, is nearly always marked by a relative lymphocytosis. Here Bergel's¹⁰ work must be

mentioned in which he pointed out the lipolytic action of lymphocytes, and showed that an increase in these cells occurs in those infections whose etiological agent contains lipid substances, such as the tubercle bacillus with its waxy capsule. This mononucleosis is protective,¹⁹ and its practical application has been observed, for it is well known that tuberculous patients with high lymphocyte counts give the best prognoses.²⁰

Nearly all the protozoan diseases, as malaria, filariasis and trypanosomiasis, etc., which have a normal or decreased number of white cells, have been reported as showing lymphocytosis.

Although not proven to be infectious, the so-called primary anemias show a relative lymphocytosis and leukopenia. The blood picture in scurvy and rickets²¹ is similar to this, and upon this basis we can account for the lymphocytosis which they are said to show.

In the German literature, frequent mention is made of "post-infectious" lymphocytoses. This is, perhaps, a general phenomenon which, as just noted, is marked in typhoid. It would seem to speak for an important part in anabolism played by these cells with their high percentage of nuclear material.

An increase in lymphocytes has been observed after therapeutic injections of iodine²² and its derivatives, phosphorus, arsenic, tuberculin¹⁰ and thyroid extract. This has found explanation in Bergel's work upon the relation of lipoids and lymphocytes, the above-named drugs all influencing lipid metabolism. Alcoholism has been said to produce an increase in lymphocytes, even to 57%.²³

An increase in the hyaline cells has been noted during radium²⁴ and x-ray²¹ cures. This may be due to lymph gland stimulation.

Protein anaphylaxis is marked by a mononucleosis, but Schleck²⁴ states that it is difficult to determine whether this is connected with the anaphylaxis, as such, or is a post-toxic lymphocytosis. It is interesting to note that Schilling²¹ names sympathetic ophthalmia as marked by this blood picture, which is another evidence that this phenomenon is an anaphylactic one.

Only brief mention need be made of the relation of lymphatic leukemia and status lymphaticus to this subject, the mechanism being clearly that of Type I. The increase in lymphocytes after splenectomy is explained as a compensatory activity of the other lymphatic tissue in the body.

We approach with caution any discussion of the relation of the endocrine glands to this subject. Kocher and his school²⁵ claim that lymphocytosis occurs as a direct result of thyrotoxicosis and varies with the degree of toxicity. But Falta,²⁶ Borchard²⁷ and others have shown that this same blood picture is present in many other ductless gland disturbances. Their claim that a secondary status lymphaticus results in all endocrine gland dysfunctions offers an easy explanation of the lymphocytosis, but clinical

evidence does not agree that such a state occurs in all endocrinopathies. Klose²² maintains that hyperplasia of the thymus results, at least, in thyrotoxicosis, and this produces the mononucleosis. It was noted previously that therapeutic administration of thyroid extract produces a lymphocytic increase. The active principle of this extract is an iodine-containing compound. Iodine and its derivatives produce this same response by their influence in stimulating lipid antibodies, which Bergel¹⁰ has shown are furnished by the lymphocytes.

It is no stretch of the imagination to conceive of the lymphatic tissue as a part of the endocrine system, and thus regard a mononucleosis as direct evidence of disturbance in some of the ductless glands. Present knowledge of the intricate relations existing between the endocrine glands is not extensive enough to eliminate such a possibility.

Before turning to a discussion of the data, there remains but one more condition worthy of mention, namely, disturbances of the vegetative nervous system, neuroses of the vagus nerve or vagotonia.⁵ The association of eosinophilia, also, with this condition, has been mentioned by Eppinger and Hess.²³ The many points of resemblance between vagotonia and some of the endocrinopathies may point to a common etiology for the lymphocytosis observed in both.

The conditions named in the preceding paragraphs by no means include all of the disease states which have been said to show mononucleosis, but an outline has been given into which could be fitted most of the conditions met with. For example, epilepsy produces lymphocytosis which we class as Type II, that is, purely mechanical and a resultant of the violent muscular effort which is accompanied by adrenalin discharge and contraction of the splanchnic vessels.

In view of the many abnormal conditions which are accompanied by lymphocytosis, it is frequently necessary to unearth all of the patient's pathology in order to find the causative agent, for oftentimes this blood-finding bears no relation to the major complaint, but depends upon some minor, concomitant condition. Under such a system as group study, which endeavors to ascertain all of the pathologic conditions which a patient presents, any finding such as a lymphocytosis should be accounted for.

Before considering the data at hand, it is necessary to state the standards used in judging them. It must be determined what constitutes an abnormal increase in the lymphocytes. The normal seems to vary according to geographic location, but, fortunately for this discussion, a normal for this locality has been established by Mehrtens,²⁰ who studied the blood of 100 normal doctors, medical students, nurses, soldiers and others such as he could obtain. The average percentage of large and small lymphocytes in his series was 37.45. This is somewhat higher than the figures of Johns,²¹ Miller,²²

Bunting,²³ and others who have tried to establish normals for their localities. The term "lymphocytosis" is hereby interpreted as meaning 38% or over. Of 300 patients in this series 57, or 19%, showed such a lymphocyte percentage.

The number of diagnoses made upon the 57 cases constituting the series ranged from one to fourteen (with an average of six). A study of these diagnoses showed that the lymphocytosis in 40 cases was accounted for by some one or two of the list of causes just mentioned. This leaves 17 cases in which the finding is unexplained.

Only five of the previously named causes of lymphocytosis were represented in these diagnoses, namely, tuberculosis, syphilis, thyrotoxicosis, primary anemias and childhood. Twelve cases had combinations of two of these conditions. Reference to Table I shows the number of each occurring alone and in combination.

The remaining 17 cases were studied in respect to the diagnoses made in each, with the following result: Twelve of them showed hypertrophied or diseased tonsils, pyorrhea alveolaris, or alveolar abscesses, or combinations of two or all three of these conditions. The details of this are also to be found in Table I, as well as the frequency of these three pathologic states in association with the five conditions named in the preceding paragraph.

Of the five cases in which the mononucleosis was unaccounted for in the diagnoses, one showed general adenopathy and an enlarged spleen, which were recorded as unexplained findings; one other had an enlarged spleen and a spastic colon. Only one diagnosis was made in each of the remaining three cases, and this did not in any instance account for the hyaline cell increase.

An unique method of statistical study is afforded by recording all the pathologic states possible of discovery. For example, if we chose any finding, such as lymphocytosis, and then study all the diagnoses made upon the cases showing this finding, we should ascertain those disease states in which this blood picture most frequently occurs. Also, these diagnoses should have a higher incidence in the group of 57 cases than in the 300 from which this group was selected. Such data is shown in Table II.

The 57 cases were segregated into three groups, on the basis of the total white count. Forty showed a normal count (5000 to 10,000) ten an increase over 10,000 and seven a leukopenia.

A few points brought out by the table are worthy of note: Tuberculosis is a more frequent diagnosis in the groups with a normal white count and leukopenia. A separation of the tuberculous cases into healed and active ones, shows that the former average 45+ % lymphocytes, while the latter only 44+ %. This difference is more forcibly brought out by the same figures for 99 cases of pulmonary tubercu-

losis which occurred in the 300 cases. Fifty-seven healed cases averaged 30.78% lymphocytes, while the 42 active ones averaged only 27.81%.

These data also bear witness to the fact that lymphocytosis is higher in healed or favorably progressing cases and, therefore, has prognostic rather than diagnostic value in this disease.

The greater frequency of hypertrophied or diseased tonsils in the 57 cases than among those making up the whole series can safely be taken as an indication that chronic disease of these lymphogenous organs is apt to be accompanied by hyaline cell increase.

Pyorrhea alveolaris and alveolar abscesses likewise have a greater frequency in the 57 cases. It must be borne in mind, however, that these two infections may be the cause of tonsillar activity, which, in turn, is evidenced by an increase in the mononuclear elements in the blood.

These data seem to confute the unqualified statement that syphilis is accompanied by lymphocyte increase. It is noted that the ten cases showing an absolute lymphocytosis include three diagnosed as syphilis. A very interesting fact is brought out in the statement that the three patients with positive Wassermann reactions had an average lymphocyte count of 49%. This recalls Bergel's¹⁰ work, in which he showed that some lipolytic action on the spirochete is necessary before a positive Wassermann reaction can be obtained. The extensive work of Mayer and Gourdy³⁴ point out definitely the relation existing between early syphilis and lymphocytosis.

The average eosinophilia count in these ten cases is 3.9, while it is only 1.3 for the whole group of 57. This shows the association of eosinophilia with absolute increases in lymphocytes. The association of these two in congenital lues,¹³ endocrinopathies,³⁶ and vagotonic states²⁰ is an important point in differential diagnosis.

Spastic colon and constipation were two conditions rather more frequent in our series of 57 cases than in the 300. That the term "spastic colon" is entitled to the dignity of a diagnosis is questioned by many; but its association in our series with a lymphocytosis calls for some comment inasmuch as Hoxie³⁵ has shown that an increase in the mononuclears occurs in what he

calls "auto-intoxication due to colonic stasis." Kauffmann,³⁶ in 1914, reported a lymphocytosis in 90 out of 140 cases of gastro-intestinal disease "combined with more or less numerous signs of vagus- or sympathetic irritation." If colonic spasticity is a manifestation of what Falta³⁶ calls "vagal neuroses," we have a reason for expecting an accompanying lymphocytosis.

The presence of chronic appendicitis and chronic otitis media in the table is to be noted. Remembering the chronic mouth infections mentioned previously, we are inclined to the belief that chronic infections, other than tuberculosis and syphilis, may be accompanied by a mononuclear increase.

CONCLUSIONS.

1. The lymphocytosis occurring in tuberculosis is more apt to be a relative than an absolute one and is more marked in healed cases.
2. A lymphocytosis in syphilis is less frequent than in tuberculosis, but an absolute lymphocytosis, especially when accompanied also by eosinophilia, is suggestive of luetic infection. Those cases of syphilis which show a lymphocytic increase are most apt to have a positive Wassermann reaction.
3. An absolute increase in lymphocytes is often accompanied by an eosinophilia.
4. Chronic mouth infections, especially when associated with diseased or hypertrophied tonsils, cause an increase in the mononuclear elements of the blood.

TABLE I.

	ALONE	TUBERCULOSIS	STYLLIS	WITH TUBERCULOSIS HYPER- OR DIS- EASED TONSILS	PYORRHEA ALVEOLARIS	ALVEOLAR ABSCESS
Tuberculosis	14	—	4	5	10	9
Syphilis	5	4	—	1	5	7
Thyrototoxicosis	5	5	1	—	8	7
Primary anemias	2	0	0	0	1	1
Childhood	2	0	1	0	2	1
Hypertrophied or dis- eased tonsils	1	10	5	8	—	7
Pyorrhea alveolaris ..	1	9	7	7	14	—
Alveolar abscesses ...	2	10	3	6	7	13

TABLE I shows the most frequently occurring diagnosis in 57 cases with lymphocyte count of 38% or over. The combinations of any two are also recorded. Nineteen patients had two, and six had three of the conditions named.

TABLE II.

NUMBER OF CASES	TOTAL WHITE CELLS PER C.C. M.M. OF BLOOD	TUBERCULOSIS	TONSILS	PYORRHEA ALVEOLARIS	ALVEOLAR ABSCESS	THYROTOTOXICOSIS	STYLLIS	SPASTIC COLON	CHRONIC APPENDICITIS	CHRONIC OTITIS MEDIA
300		32.60	27.00	27.4	14.00	14	19.00	14+	5+	5.00
57	(Lymphocytes)									
	38%	42.00	40.25	40.25	33.25	19.25	17.50	17.50	8.75	8.75
40	5,000-10,000	47.50	47.50	45.00	37.50	25.00	17.50	22.50	10.00	12.50
10	Over 10,000	20.00	30.00	30.00	30.00	10.00	30.00	0	10.00	0
7	Under 5,000	43—	14+	28.50	28.50	0	0	14+	0	0

TABLE II shows the percentage of cases in each group which were diagnosed as having the conditions named. The greater frequency of these conditions among the 57 cases with 38% lymphocytes is illustrated by the higher percentages in the second row as compared with the first.

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THE VEGETATIVE NERVOUS SYSTEM FROM THE CLINICAL VIEWPOINT.*

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WHILE the territory indicated by our title is very great, our knowledge of it is not, and the portion of our knowledge having sufficiently practical bearing to warrant presentation at the present time is still less. However, when the practical available material is reduced to lowest terms, there yet remains enough to furnish ample for many papers of the length which this can reasonably assume. I shall, accordingly, utilize the scope of the title merely to permit the observation of a few of the more important points now discernible as a result of the studies of numerous physiologists and neurologists. Langley, Jacobsohn, Müller, Sherrington, Hess, Eppinger, and Timme, among others, should be accredited at the outset with having furnished and collected much of the information which has opened the way to us for more intelligent clinical observation. The papers of Hess and Eppinger and of Timme discuss most of the clinical essentials available up to the present. When one's interest in the significance of the vegetative nervous system is fully aroused, certain obscure symptomatic manifestations take on new aspects and—if one may in a general way anticipate conclusions—help to clarify the mechanism of symptomatology and point out certain medical and surgical leads in therapy. Confusion in nomenclature, coupled with seemingly contradictory experimental evidence, has rendered obscure the arrangement

and function of the various elements of the vegetative nervous system; but there cannot be the least doubt that this system plays a far-reaching rôle in every conceivable pathological process, as well as being a factor of inestimable importance under normal conditions. Through its activities and the degree of its sensitization to various stimuli, it is essential in determining the functional type of the normal individual.

While it would be out of place here to enter too minutely into a discussion of anatomy, certain outstanding anatomical and physiological essentials must be borne in mind in order to furnish a basis for our discussion.

It is better, as Langley has pointed out, to abandon the term "sympathetic system" in its too general meaning, and to recognize that the true sympathetic is but a subdivision of what is known as the vegetative nervous system which furnishes fibers to smooth muscles throughout the body as, for example, to the intestines, blood vessels, gland ducts, and skin; also to certain cross-striated muscles, such as the heart, the terminal parts of the alimentary canal and the genital apparatus, and also furnishes secretory fibers to glands, in contrast to the sensori-motor nervous system, which supplies voluntary muscles and the special senses.

The vegetative nervous system, according to Langley and others, is divided into:

- (a) The autonomic system, and,
- (b) The sympathetic system proper (also called the thoracic autonomic), which arises from the sympathetic cells in the lateral horns of the spinal cord from the first thoracic to the fourth lumbar segment, and whose fibers pass out by the white rami to the gangliated cord on each side of the anterior aspect of the bodies of the vertebrae. By its peripherally connecting fibers it supplies the skin, blood vessels, glands, viscera and internal generative organs.

The autonomic is further subdivided into:

- (a) The mid-brain autonomic which originates beneath the anterior corpora gemina and supplies (contractor) fibers to the iris and ciliary muscles.
- (b) The bulbar autonomic, which arises in the region of the fourth ventricle and which, by way of the facial, the nervus intermedius, the vagus and the glossopharyngeus, supplies the vessels and glands of the mouth, pharynx, nose, esophagus, stomach, small intestine, part of the large intestine, the trachea and lungs. It is important to note at this point that the vagus is an important member of the autonomic group, and to remember its wide distribution, as well as the fact that its influence on the gastro-intestinal musculature is contractile.
- (c) The sacral autonomic which, leaving the spinal cord from the first to the third sacral segments as the pelvic nerves, supplies the descending colon, rectum, anus, bladder, urethra and external genitals. Omitting a description of the course, and finer arrangement of the fibers of

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the vegetative system, one may correlate the above statements thus: The vegetative system is made up of two gangliated cords, one on either side of the vertebral column, consisting of a series of ganglia united by short cords. These two gangliated cords extend from the base of the skull to the coecyx. Superiorly, they connect with plexuses which enter the cranial cavity, while inferiorly they converge on the sacrum and terminate in a connecting loop on the coecyx. Each of the ganglia of each of these cords corresponds to one segment of the spinal cord except in the cervical region where, instead of seven, there are only three ganglia (Timme). All these structures are furnished, directly or indirectly, with connecting fibers supplying the motor or secretory mechanisms previously mentioned. In most instances the ultimate terminus is reached only through other peripherally located ganglia which, with their connecting fibers, compose the visceral plexuses. Ganglia so located are known as prevertebral ganglia, in contradistinction to the vertebral ganglia found in the gangliated cords. The use of the term "sympathetic" is restricted to nerves arising from the gangliated cords, whereas all other vegetative nerves are spoken of as autonomic.

It will be seen from the foregoing that many of the structures innervated by the vegetative system have a double vegetative nerve supply; thus all those supplied by the cranio-bulbar and sacral autonomic are also supplied by the true sympathetic. According to Eppinger and Hess, in every visceral organ the sympathetic and autonomic have antagonistic action. It is doubtful whether this is true regarding the bladder, as in this instance, it would appear that stimulation of either system produces contraction, though the antagonistic action may obtain in relation to sphincter control.

In the case of the salivary glands, stimulation of either the sympathetic or autonomic appears to increase secretion.

As a working hypothesis, it is well to imagine the viscera as, in a sense, suspended between these two antagonistic forces. By assuming this conception it is easy to see how disturbing may be faulty function of one or the other system.

Examples of structures probably having but a single vegetative nerve supply, *i.e.*, from the true sympathetic, are the blood vessels, glands, and smooth muscles of the skin (though the evidence of vaso-dilation of the skin vessels and their susceptibility to pilocarpine in vagotonia raises a question in this instance), blood vessels of the gut, the spleen and the internal generative organs.

Owing to the continuous antagonistic action of the two systems,—autonomic and sympathetic,—neither manifests normally its full function. By the normal state of relative equilibrium between the two is determined the tonus of the various structures involved. If, by reason of increased irritation of either system, a disturbance of equilibrium is produced, so that

we get an overtone of one or of the other, the condition known as vagotonia, *i.e.*, overactivity of the autonomic, or sympathicotonia, *i.e.*, overactivity of the true sympathetic, results. Vagotonia is in certain cases so clear-cut that it has been described by some writers as if it were a clinical entity. Whether vagotonia is really an overstimulation of the vagus or autonomic system, or is actually an inhibition of the sympathetic, allowing a relative preponderance of autonomic function, is not entirely clear.

It is not unlikely, inasmuch as we are well aware that either system is readily influenced by psychic influences, that each may have a definite center or both a common controlling center in the central nervous system. It is well known that the true sympathetic depends chiefly for its stimulation and continuity of function on the activity of the adrenals and chromaffine system. The chromaffine cells accompanying, as they do, the sympathetic ganglia, are conveniently located to serve their purpose. It is altogether likely, though not proved, that a hormone also exists in the body which has the specific function of stimulating the autonomic system; theoretically, the absence of this hormone would give rise to symptoms of overactivity of the sympathetic by suspending the antagonistic action of the autonomic. Certain it is, that there is an essential interdependence between the vegetative system and the glands of internal secretion. It is not necessarily true that adrenalin is the only physiological sympathetic stimulant, for numerous organs which are under the combined control of both systems may, themselves, under varying conditions, have a depressing or stimulating influence on one or the other division of the vegetative system; furthermore, several of the endocrine organs may be involved in helping to regulate this complicated mechanism.

Much of the study of the vegetative system has been conducted along pharmacologic lines: for example, we know that the autonomic ends may be stimulated by the cholin group,—cholin, pilocarpin, physostigmine, muscarine,—or paralyzed by drugs of the atropine group; whereas the sympathetic ends react to and are stimulated by the adrenalin group and are paralyzed by no known agent. The autonomic may be centrally excited by picrotoxin and the sympathetic by cocaine, atropine and caffeine, and the latter may be centrally depressed by morphine, chloral, and the antipyretics; centrally, botulinus toxin depresses the vagus. Clinically, a special susceptibility to one or the other of these substances, especially to adrenalin, pilocarpine, or atropine, is of diagnostic aid.

A clear understanding of the physiology of the vegetative system is rendered more difficult owing to the essential irritability which certain of the viscera possess in themselves, *i.e.*, the autonomy of function independent of any known central nervous connection. Thus the mechanism of intestinal motility is regulated not only by

the vagus and the true sympathetic, but also by the automatically acting plexi of Auerbach and Meissner, so that certain drugs—such, for example, as ergot—may produce motor effects by direct stimulation of the intestinal musculature.

Brief mention may now be made of the more outstanding features incident to autonomic over-activity, i.e., the condition known as vagotonia. The following should be especially borne in mind: moderate myosis, active salivary secretion, tendency to free perspiration, moist hands and feet; in certain instances skin pigmentation, bradycardia, especially the type changing to tachycardia by the use of atropine; Aschner's phenomenon, which consists in marked slowing of the pulse when pressure is made on the eyeball, a sign common in vagotonia, which may be eliminated by the use of atropine; bronchial asthma, respiratory arrhythmia, increased gastric and intestinal tone, gastric hypersecretion and hyperacidity, low blood pressure, eosinophilia. It is very important to note that in true vagotonics the symptoms are exaggerated by pilocarpine and at least partly relieved by atropine.

The symptoms mentioned will recall to your minds many of the pathologically indefinite cases which usually are classified as psychoneurotics.

In instances of over-activity of the true sympathetic, on the other hand, one expects to encounter some of the following symptoms: mydriasis, exophthalmos, free salivary secretion, low gastric acidity, gastric and intestinal hypomotility, tachycardia, increased blood pressure, gastric atony, dry skin, negative Aschner's phenomenon, negative pilocarpine test, but increased symptoms with administration of adrenalin chloride. In our experience mixed types are much more common than pure types of either group. Inasmuch as it has been regarded that the two symptom groups may occur, as Eppinger and Hess say, as due to "inferior constitutional make-up," one is justified in distinguishing certain not especially abnormal individuals as temperamentally autonomic or sympathotonic. It should be understood that we do not maintain either condition to be a pathological entity, but rather an expression of secondary condition of tonus.

In our recent experience clear evidences of disturbances of the vegetative system have been very frequently seen and have presented themselves in a variety of conditions.

While these disturbances obviously occur in acute diseases, it is the low-grade subacute or chronic process which interests us at the present time. As has been already stated, we encounter more frequently what seems to be a combined disturbance of the autonomic and sympathetic than we do the strictly clear-cut vagotonic or sympathotonic patient—for example, an individual with several vagotonic ear marks not infrequently is observed to have a somewhat accelerated rather than a slow pulse,

and somewhat dilated rather than contracted pupils. Taking into consideration such combinations, one may still state that there is in these patients a definite preponderance of symptoms conforming to one type or to the other, as the case may be. Practically all such cases are superficially regarded as "neurasthenic."

It is impossible to classify properly the instances of disturbed vegetative innervation which we have seen, for the distinction is one of symptomatology, in many instances, rather than one which yet permits clear-cut diagnostic limitations. Presupposing, however, that in practically every instance the patient is one of those individuals to whom, owing to a generally asthenic state, the terms, "auto-intoxication," "neurosis," "neurasthenia" and the like have been applied, one encounters, in addition to this general picture, certain definite disturbances of function, such as alteration of blood pressure and pulse rate and quality, hyper- or hypomotility of the gastro-intestinal tract, resulting in marked cases on the one hand, in pylorospasm and persistent spastic constipation, and on the other hand in an atonic condition of the gastric musculature and atonic constipation; a positive Aschner phenomenon, a hyper- or hypogastric secretion, a hyper- or hypogastric acidity, moist hands and feet, moderate exophthalmos, obvious disturbances of skin circulation, evidence of improper endocrine function. In all such instances due consideration must be given the vegetative system.

While recognizing the fact that definite lesions such as gastric ulcer, appendicitis, gall-bladder disease, intra-abdominal adhesions and numerous other pathological processes must, of necessity, produce definite disturbances of the vegetative system in many instances, we may omit them from present consideration as they furnish their own medical or surgical indications in most cases, in part, at least, independently of reference to the vegetative system; though it is our opinion that more thorough study and more carefully considered and applied surgical reconstruction, which aims at correction not of one lesion only, but of all available factors of obvious disturbance, offers a future possibility of relief for at least a portion of these sufferers. The question then arises, what, aside from the more commonly recognized pathological lesions in such cases, is probably responsible for vegetative system disturbances? It would appear that in some instances, not so very common, long-continued nervous fatigue is an element. Postural abnormalities, including the more pronounced cases of visceroptosis, with their attendant mesenteric drag (the parietal mesenteric attachment being a close neighbor of sympathetic ganglia), may explain, in part, at least, certain cases. At all events, there is much in favor of correcting, in as far as possible, the disturbed functions incident to such conditions in atonic individuals by postural methods and proper exercises, together

with medicinal measures. Undoubtedly, long-continued psychic disturbances are productive of damage of the types under consideration, and in such cases one must recognize that conditions of psychic origin are entitled to psychic as well as general medical assistance.

Probably the two factors deserving of the greatest emphasis—so far as one can judge from clinical observation and therapeutic and operative results—are obscure infections, and disturbances involving the glands of internal secretion. A considerable number of cases could be cited, illustrative of this contention. We have become thoroughly convinced that in our marked vagotonic cases, if a clear-cut source of infection, as, for example, chronically infected tonsils, peridental abscesses or foci elsewhere can be demonstrated,—other things being equal,—we are much more likely to get ultimate satisfactory results if all these toxic sources are thoroughly cleared up, by operation, if necessary. Not only is one sustained in this view by favorable clinical results not obtained by us formerly in some of the same patients for whose relief we had previously used other recognized methods, but the number of positive blood cultures obtainable in such cases, as well as the recognized effects of such infections on other structures, adds weight to the conviction.

With regard to the endocrine system, which in its relation to the vegetative system would furnish a vast amount of material for discussion, one illustrative condition will have to suffice, namely, hyperthyroidism, which furnishes typical evidence of clear-cut sympathicotonia. Rather than to review the familiar symptoms of hyperthyroidism, I will mention briefly the particularly valuable and applicable recent contribution of Goetsch. I refer to the adrenalin chloride test for the determination of the presence or absence of hyperthyroidism. Supposedly, in hyperthyroidism the true sympathetic system is sensitized by the over-abundant thyroid secretion, and as a result of this condition, one may, by the subcutaneous use of small doses of adrenalin chloride in border-line cases, bring out almost immediately the phenomena of hyperthyroidism, with typical changes in the pulse and blood pressure curves and the development of other characteristic manifestations. The reaction is transitory, lasting not over an hour and a half and gradually subsiding. This is not the time for further discussion of the test, as Goetsch's original work has not yet been fully published; but that he has utilized the functional susceptibility of the sympathetic as the basis for a most valuable clinical test is obvious to any one who has had opportunity to try it in several cases of varied degrees of thyroid activity.

It is impossible to enter further into the field of therapy beyond the restatement of the fact that certain substances have a specific influence on the autonomic and sympathetic systems;

these substances, in our experience, in most instances ameliorate but do not cure. Organotherapy is of distinct value in a limited number of instances, but the real attack must be directed at the etiology. As these conditions are usually chronic, prompt results do not occur; but when the causal elements can be removed, as is in many instances possible, and when suitable reconstructive measures can be instituted, the results are certainly more promising than formerly.

HEALTH INSURANCE AND THE MEDICAL PROFESSION—FROM THE FINANCIAL AND ADMINISTRATIVE POINT OF VIEW.

BY R. M. BRADLEY, BOSTON,

Trustee of the Thomas Thompson Foundation.

It is perhaps desirable for a layman, in addressing a professional journal, to attempt to qualify as a witness. For a number of years past I have had charge of a considerable fund very largely directed to the alleviation of sickness and its consequent distress. I have thus had occasion to observe the results of medical work in many hundred individual cases and to study the effect of organized nursing and hospital work established in fields where it had not previously existed. I have, likewise, assisted in two canvasses involving the results of existing medical work. In one of them all the ascertainable cases of sickness were covered in a typical population of about 10,000, partly rural and partly urban, and an effort was made to find out what had happened or had not happened to each of those cases in the way of medical and nursing care. In the second canvass in a leading American city, 2000 maternity cases were similarly canvassed, not in a slum population but in districts occupied by families of well-paid mechanics, and others of like independent circumstances. I have, likewise, had occasion to assist in having examinations made of the physical condition of school children, amounting in all to between two and three thousand.

Throughout this task, the work of the medical profession has been looked at from the outside with a view simply to success obtained, or not obtained, in procuring the application of medical, surgical and nursing skill. The investigations have been lay investigations that have not undertaken to discuss or in any way to decide what should be the approved professional methods. What has been looked into has been whether there has or has not been any service at all approximating in any way to any standard professionally established.

This study has been by one who has the greatest respect and admiration for individuals in the profession, and the highest appreciation of the great advances that have been made in the methods of handling disease and disability—when it is handled. It has resulted, however,

in an almost overwhelming sense of dismay and despair at the enormous gap that exists between that which it is now possible to do for cases when reached by standard medical and nursing practice, and that which is actually being done, the failure existing, not in the nature of the methods, but in getting them applied.

It has seemed to me, in short, that there cannot be any other field of human effort where such a small percentage is actually accomplished of what is plainly possible and at the same time vitally necessary.

I find that my own experience is merely a small part of what is now being found everywhere by others, and that these conditions have only to be comprehended by the laity, to be found intolerable.

From the growing public consciousness of this state of affairs, there has lately arisen a demand for a remedy, taking the shape of a call for state-regulated health insurance, with all that this implies. This movement, which is gathering strength with each year, promises to take away a large part of the control and direction of their own occupation from the most individualistic body of men in what has hitherto been one of the most individualistic of nations. The growing strength of this demand holds out prospects of future working conditions for the physicians that are in many respects most ominous, and yet, as against the conditions that now exist, there is very little that can be held up to the average voter as likely to be more unsatisfactory than what he sees happening all about him. The call for state interference is, therefore, going to prevail unless something better is offered.

In the face of this situation, the medical profession stands apparently helpless, and what little it is doing seems to be chiefly in the line of obstructing or modifying proposed legislation. The better way out seems hardly thought of, namely, how the profession can best keep control and direction of its affairs by accomplishing what the public has the right to demand, the public having no desire to take this work out of the hands of the profession except for the failure to meet its needs.

As an American, I believe that whatever may be the best way for other peoples, our own best hope as a nation of full development and high attainment, in accordance with our genius, lies in retaining personal independence and individual initiative to the fullest degree possible under our complicated civilization. I also believe that, where full individual independence is no longer possible, it is desirable to retain the advantage and the efficiency of private and semi-private combinations of individuals as against an all-absorbing, single-headed, soul-killing state collectivism. I believe that this state collectivism, which to the sociological enthusiast is holding out so many attractive short cuts to immediate accomplishment, is what constitutes the chief menace of our time to true and continued prog-

ress. That progress in the end can be based only on the fullest attainable freedom of individual development and accomplishment,—a freedom that does not flourish where government control is all-pervading.

This is the belief, I know, whether formulated or not, of most Americans; but in the face of existing tendencies, it needs to be backed by effective action, and not by the futile defense of individualistic methods that are proved to be no longer adequate. I cannot, therefore, refrain from asking whether it is necessary for the medical profession to contribute, at the cost of its own freedom, to the present tendency towards state collectivism, by ignoring what seems to be the necessary steps towards itself doing the work that the public needs to have done.

The profession has this situation to face. Abundant evidence has been produced to show that, with a very few possible exceptions, wherever the field of its labors is surveyed, conditions like the following are found.

A large proportion of the cases of disease and sickness are untouched by proper care, especially in the incipient stages, where care most often produces results. A large portion of the maternity cases go into the perils of childbirth without the most obvious and rudimentary precautions, and the mothers are obliged, from lack of organized care, to resume their usual occupations so soon after confinement that they suffer the greatest possible amount of permanent injury. A large proportion of the children are left with untreated physical defects that, as a result, must handicap them for life. In general, throughout the field of the physicians' labors the failure to accomplish that which can and should be accomplished is found to an extent that without question is quite intolerable when once recognized.

It cannot be questioned that this condition of affairs exists or that it calls for a remedy. What can be questioned is whether the only possible remedy lies in having the state take charge of the physicians' business. A better remedy lies in the application by the physicians themselves, through the agency of business organization, of certain measures that in any other lines of enterprise would be natural and obvious.

There are two modern elements of accomplishment that seem to be conspicuously absent in the physicians' work as now applied, namely, financing to suit the work and conditions, and the intelligent application of coördinated labor performed.

To begin with the first: Medical and surgical work is largely emergency work in most of its important crises. Severe disease or disability strikes here and there apparently at random, entailing great expenses to one family and leaving another for years comparatively immune.

This evidently calls for the evening-up process of insurance, if the ordinary self-supporting family of moderate means, which makes up the

bulk of the population, is to be served. The average family can no more meet and pay for many of the emergencies of sickness out of its current income than it can meet the results of a burned home from the same source. Little or no attempt is made to finance family sickness emergencies except crude and impossible attempts by irresponsible lodge doctors. The result of this state of affairs in the form of deferred operations and treatment, neglected precautions and acute distress, can be seen on all sides.

There are few other forms of enterprise that at the present day would fail, under such circumstances, to bring about the necessary means of financing the delivery of their goods or service.

Supposing that such financing were arranged for in the form of regular payments. Would not there follow, under ordinary circumstances, careful calculations and planning, so that the fulfilling of the contract could be accomplished to the fullest possible satisfaction and at the least cost of labor and materials?

Supposing that a group of responsible medical men should undertake through a business organization to see a group of, say, a thousand families through a year of their earthly pilgrimage, and should plan it out with some of the same care and foresight as is furnished by, say, Raymond and Whitcomb for a European or Oriental trip. A little of what the organization would do is sometimes provided for paupers in a well-organized dispensary, but not for policemen, clerks and letter-carriers and their families, who reach the organized service of the dispensary only after they have suffered the consequences of what is not done and have become, as a result, members of the order of down-and-out. Prevention and early treatment would come first. There would be well-organized examinations so that existing conditions could be ascertained with the least labor cost. Correction and precautionary advice would follow, so that as much as possible of the usual emergency work during the year would be prevented.

It would be dangerous for a layman to go on with the specifications of how the best service could be rendered at the least cost to the contracting parties. What is entirely certain is that those served could afford to pay more for better results, and those better results could, by intelligent coöperation and arrangement, be produced at very much less cost.

It will probably be claimed that the organizing and financing of such service by voluntary association is not practicable, and it can be answered that there is very little market for goods that are never offered. It can also be said that, if the public discovers that these goods are a necessity, some cheap and inadequate substitute for the thing lacking is fairly sure to get into the market.

That is what is coming in this case. The public has come to see its need of having its sickness

emergencies financed by insurance protection and the need of some form of more efficient service that it believes insurance could procure.

A contract something like that outlined above will be furnished under government initiative and regulation, but it will probably be a poor American imitation of England's poor imitation of Germany; out of accord with our own real genius of highest accomplishment.

Therefore, instead of the highest standards of service that might be worked out by voluntary business organization, we are likely to get something vastly inferior; and the loss and suffering resulting will be infinite.

The above will probably serve chiefly to relieve the mercenary mind of a layman. It is to be feared that anything that may be said in this line will get little attention from the profession, for the physician is the last man to take his own medicine. He will say with all sincerity and emphasis that the layman who tries to be his own physician is a fool; and then he will turn about and act on the assumption that there is nothing to be got from the layman in the way of administering to the diseases of his own financial and business organization.

The fact remains that, owing to this indifference to the use of modern business methods, the work for which his training and education have equipped him is not being accomplished, and a dissatisfied public is proceeding to put his business into political leading-strings.

NOTE.—Since writing the above, the writer has visited Framingham, Mass., and has found similar specifications being put in practice by Dr. Armstrong in the demonstration that he is conducting there.

GOITER SURGERY, WITH REPORT OF 28 CASES OPERATED UPON, WITH ONE DEATH.*

BY GASTON TORRANCE, M.D., BIRMINGHAM, ALA.,

Surgeon to the Birmingham Infirmary.

Most animals are well supplied with thyroid and other ductless glands and are apparently not affected by the removal of large portions of the gland. In growing children it is estimated that one-third of the total thyroid found in the normal person is needed; while only one-sixth of this is necessary in the adult. Some surgeons hold that the total removal of the thyroid is harmless in the adult and should be practised in certain diseased conditions, but Mayo thinks that it should never be done except in malignant conditions. C. H. Mayo says that possibly three of the four parathyroids may be removed without causing any serious symptoms, but advises taking every precaution not to injure them. When one of the parathyroids is found to have been removed, it should be transplanted to some part of the wound, and where the whole gland has to be removed and the patient develops tetany, this can be controlled by the use of lactate of calcium, and at the same time the pa-

* Read before the Jefferson County Medical Society.

tient should be given thyroid and parathyroid gland.

Blair divides goiters clinically into: (1) True exophthalmic; (2) Toxic, simple; (3) Non-toxic, simple; (4) Simple; (5) Inflamed; (6) Malignant.

Goiter—Causes. Rosenow and others have found that bacteria can be cultivated from some of the crushed glands, but the investigations have not been carried far enough to form any definite conclusions. Buford (Goiter in Children) has frequently found diseased tonsils with great cheesy masses and pus in children with enlarged thyroid. He finds that the right lower lobe is more frequently involved in this class of cases and suggests "a differentiation in function of the various areas of the thyroid." This hypertrophy usually subsides when thyroid is given and the source of infection is removed (tonsils, adenoids and teeth). Summers reports that he operated on a mother and three daughters for goiter, and there were other members of the family who had goiter, and there was an ancestral history of goiter. In another family the mother and father had goiter, three infants that died had goiters, and four older living children had goiters and an infant was operated on successfully when eight days old for goiter that threatened asphyxiation.

Exophthalmic—Causes. MacKenzie says in more than one-third of his cases some more or less severe mental shock or strain preceded the onset of the illness, and predicts that many more cases will be found from the effects of the great ordeal the women of England are now going through. He gives the post-mortem results from 36 cases made in St. Thomas' Hospital, in which a persistent, and often much enlarged, thymus gland was found; in seven cases no mention of the gland was made.

Metabolism in Exophthalmic Goiter. An increased basal metabolism was found by Dubois with great regularity in exophthalmic goiter. Thirty-seven observations were made on 11 cases of exophthalmic goiter. The measurement of heat production gives the best index of the severity of the disease and of the effect of treatment. Very severe cases show an increase of 75% or more above the normal average, severe cases 50% or more and moderately severe and mild cases less than 50%, while a few mild and atypical, or those in which operations have been done, may be within normal limits. In severe cases the warmth of the skin and sweating can be accounted for by the necessity for the elimination of heat. Part of the tachycardia may be due to the increased metabolism, and perhaps it might be possible to produce extreme tachycardia, cardiac enlargement, emaciation and mental irritability if it were possible to stimulate the metabolism of normal men 24 hours per day over a period of months or years.

Kendall has succeeded in breaking up the iodine content of the thyroid into two groups.

About one-half the total iodine in the thyroid proteins appears in Group B. No crystals have been found in this group, and only very slight physiological action is produced by its administration.

Group A.—A pure crystalline form has been isolated, which has a constant iodine content of 60%. When given to a normal person the so-called hyperthyroid symptoms are produced: increased pulse rate, tachycardia, increase of nitrogen elimination, loss of weight, increase of nervous irritability.

Small doses, 1/180 gr. per day, when administered to cretins, has made a marked change for the better in even a few days.

Pathological Changes in Exophthalmic Goiter.—Wilson says marked evidence of weakness of the quadriceps muscle is noticed in the patient's going upstairs; in the intercostals and diaphragm as shown by the shallow, hurried respirations. He suggests that the relaxed condition of the muscles of the eye may be partly responsible for the exophthalmos. Tachycardia and cardiac dilatation have long been recognized as cardinal symptoms.

In 100 autopsies made at the Mayo Clinic gross or microscopic heart lesions were found in practically every one. The chief histological changes shown in the myocardium are an extensive fatty degeneration of the fibers. In the more advanced cases, fatty deposits are found in large amounts, more or less filling the whole muscle fibers.

Wilson and Durante have examined the sympathetic ganglia removed from 16 cases of goiter, and the changes were found to be most marked in those cases whose symptoms suggested the over-activity of the cervical sympathetic nerves. The changes found were: (a) fatty deposits in the ganglion cells, indicating previous degeneration, (b) atrophy and reduction in the number of ganglion cells, and (c) diffuse fibrosis of the entire ganglion.

Hyperthyroidism and Enlarged Thymus.—A. Koehler says there is always hyperplasia in exophthalmic goiter, but that the thymus is enlarged in only about 45 to 50% of cases, and is more frequently found in young people than in the older cases. He removes a portion of the thyroid and finds that the thymus retrogrades; he does not consider these cases any more serious operative risks. A transitory effect may be gotten by the use of thymus preparations and x-ray just before operation. H. Matti thinks the thymus should be resected before operating on the thyroid.

Blood Pressure in Exophthalmic Goiter.—Taussig says the vascular abnormalities in exophthalmic goiter are analogous to those in aortic regurgitation. The pulse pressure is high as compared to a low or normal diastolic pressure. As in aortic regurgitation, the blood pressure in the thigh is higher than in the arm (20 to 26 mm.). In non-toxic, as in the nor-

mal person, the blood pressure in the thigh and arm is the same.

Transplantation Thyroid.—E. Payr has done 7 transplantations in past eight years; the transplanted gland is gradually absorbed, in some cases lasting two and one-half years. T. Kocher has transplanted thyroid in 93 cases and had later reports from 57—18 successful, but continued taking thyroid; 18 failures; 21 successful, with no other treatment. The gland should be living and active or hyperactive, and must be transplanted into vascular tissue, spleen, or bone marrow; he generally transplants to the bone marrow.

Exophthalmic Goiter Treatment.—B. F. Tilton advocates ligating three arteries at one time through a long transverse incision under 1% novocaine, and reports some good results. Mr. Blayne (Royal Academy Medicine in Ireland) advises against operating on cases with sugar in the urine. Max B. Leviton reports two cases that were given 15 or 20 grs. pancreatin two or three times daily by rectum, in which there was complete cessation of the exophthalmic symptoms, with recession of the goiter. These cases occurred in a series of cases of diabetes. Pal's attention was called to this by the antagonistic action on the arteries of pituitary and thyroid extract. He found it has no effect on the normal thyroid, but on the gland functioning to excess there was a pronounced action. The symptoms subside, although the gland may continue to increase in size. He reports 16 cases—in 3 the patients were so debilitated that no operation could be done. Under treatment the improvement was so marked that they were later successfully operated upon. Dowd reports some thyroidectomies done with rectal anesthesia.

Cancer.—L. B. Wilson (Mayo Clinic) stated at a meeting of the Medical Society of Virginia, October, 1916 (*Journal American Medical Association*, December, 1916), that 15/10% of simple goiters have been found to be cancerous. Seventy per cent. occur after 40 years and 20% under 20 years of age. One-third of all cases are sarcoma and occur both in the young and the aged, one-half carcinoma. The initial symptom is not pain, but pressure from formation of fibrous tissue. Out of 82 patients, only 25 are alive after three years. He advocates surgery or radiotherapy.

Deaths Exophthalmic.—Dr. MacKenzie, of London (*London Lancet*, Nov. 2, 1916), says: During the four years, 1911-14, the number of deaths from exophthalmic goiter in England and Wales was 1558 females and 155 males—10 females to one male. An analysis of the ages shows that the death rate gradually rises from 10 to 35 or 40, and then goes down gradually until 80 or 85 years are reached.

Operative Results.—Judd and Pemberton report (1916) 121 cases operated in 1909. Group 1—55, or 45.4%, were cured. Group 2—22 cases (18.1%) were practically cured, but had

slight symptoms when under great strain. Group 3—7 cases very much improved, but had some nervousness and exophthalmos. Group 4—5 cases slightly improved. Group 5—8 cases derived little or no benefit from the operation.

Starck reports 450 cases of exophthalmic goiter under his care in past few years in which 69 were operated. Cures in 30%, but 35 to 40% were more or less benefited. Mortality, 9%.

28 CASES; 1 DEATH.

Large cystic	10
Exophthalmic	10
Single large cyst	1
Calcified	1
Adenoma	3
Substernal	3
	28

I have operated on 28 cases with one death, which occurred in a secondary operation on a severe exophthalmic case. Ten of these were very large cystic goiters; 10 were exophthalmic. In one case there was a single large cyst resembling a parovarian cyst when opened. One case had a small calcified growth in the right lobe: there were six adenoma, three of which were substernal and produced very marked symptoms.

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Clinical Department.

THE MENINGEAL SYNDROME AND OTHER SOURCES OF ERROR IN PYELITIS.

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 School, Boston.

Two years or more ago I saw a patient in whose condition the presence of a pyelitis was overlooked for several days by the dominance of an apparent cerebrospinal meningitis. Since then I have been searching for similar cases. While it is not probable that the condition is a common one. I think that it would fairly frequently be found, if stiffness and rigidity of the neck were to be sought for in every case of pyelitis. In most of the cases in which a pye-

litis gave an increased irritability of the spinal cord, there was a simple tenderness with slight or moderate rigidity of the neck; there was, sometimes, however, a more or less definite Kernig's sign. The presence of a Babinski reaction has not been found in the cases here reported. It seems very likely that the neck signs which, in my experience, seem to be rather transient, would be found more often if sought for daily in each patient. In hospital, however, we have not by any means found signs of spinal irritation in every case of pyelitis, even in patients examined daily for such signs.

It is difficult to account for the occurrence of such signs suggesting a meningitis, apparently caused by a pyelitis. Possibly it may be due to a simple reflex; possibly there is some pressure from an infected kidney upon the spinal column which makes the spinal cord sensitive to stretching; more likely, perhaps, there may be a more or less marked extension of the disease process to the peri-renal structures, with a slight or even fairly marked inflammation of the meninges.

On the other hand, how shall one explain a very similar condition, which does not seem to be particularly unusual, namely, the presence of an actual meningitis in lobar pneumonia, and which it seems desirable to treat, as in other cases of meningitis, by the use of repeated lumbar punctures, as recorded recently by Musser and Hufford.¹ Presumably in these pyelitis cases, as in the pneumonia cases, since the cultures from the spinal fluid are ordinarily sterile, we are dealing with a definite serous meningitis. Certainly, if we have a case in which the spinal fluid is expelled under pressure, we must assume a condition of an actual inflammation of some sort in the meninges.

Additional evidence as to the probability of the last hypothesis would seem to be given by the case of the boy mentioned above (Case 1).

This boy, when first seen, had a definite stiffness and some retraction of the neck, with a slight Kernig's sign, a history of headache and backache, a high temperature, the urine showing nothing at the time. He was sent into the hospital, where for several days the diagnosis of meningitis was not disproven. As a matter of fact, whatever may have been the definite etiology of the meningeal condition, it would seem plausible to insist that there was an actual "serous" meningitis, since the cell count made upon the spinal fluid, obtained by lumbar puncture, was very considerably above the normal count of ten to twenty cells per cubic millimeter. It seems strange that a process, the seat of which is probably so low in the spinal canal, should manifest itself chiefly by a stiffness of the neck.

Some of the pyelitis histories are reported in detail, while the others had nothing of interest beyond the presence of meningeal irritation. One case (Case 2) seemed to be of particular interest, in that he entered hospital as an acute

abdominal infection, was diagnosed as a perforated gastric or duodenal ulcer, underwent operation for this supposed condition, and in spite of extremely careful examination of all the viscera, no cause for his symptoms was found. When he came under my care he had a definite lobar pneumonia, and we felt that this was the cause of his condition. It is, of course, impossible to demonstrate whether the pneumonia was the primary condition, whether the process in his lungs developed as the result of anesthesia, or whether, as now seems probable, the primary process was the pyelitis which later made itself manifest, and which had led both the surgeon and the medical man astray.

It has seemed to me that pyelitis was a difficult condition to diagnose in any case; that a good many cases of this disease go unrecognized, and that when we meet a sudden or an intercurrent febrile condition, with the signs of a severe infection, we ought to bear this possibility in mind more frequently than I, for one, have been in the habit of doing in the past.

If any proof were required as to the difficulty in some cases of making a diagnosis of pyelitis, Case 2, just referred to, is surely to the point. This patient was diagnosed by his first medical attendant as an acute abdominal case, and by him sent to the Carney Hospital. Here, failing of finding accommodation, from lack of beds, he was considered to be suffering from acute intestinal obstruction, and sent to the City Hospital, passing under the care of a clever surgeon before he came to me, and yet we, each and all of us, failed to recognize the patient's primary condition until the day before he insisted on leaving the hospital. In this connection, I may mention that this patient did not have pus in his urine at every examination, nor was albumin reported present in each specimen. In such cases, a daily examination of the urine would enable us to avoid many errors. Why does a particular patient excrete different amounts of pus at different times? Has this absence of pus excretion at any given time any relationship to the occurrence of a chill? As I think of cases in the past, having high fever of sudden onset, accompanied by a chill, no cause for which was ever found, I am strongly led to believe that some, if not all, of these represent other failures on my part to diagnose the presence of a pyelitis, and I suspect that the sudden flare-up in symptoms might have been due to a pocketing or obstruction to the escape from the kidney of this pus. The case histories follow.

CASE 1. D. D., Italian boy, 10 years. Sept. 22, 1913. Seen in consultation with Dr. John T. Williams on Sept. 23. Yesterday patient complained of headache, vomiting, smarting micturition, onset sudden. Temperature 103, pulse 126. General physical examination negative except for a few râles scattered over both lungs. Urine shows nothing abnormal. Sept. 23. Nothing remarkable in physical examination, except for consider-

able stiffness of the neck, slight double Kernig sign, and slight Babinski reflex on the right. Patient sent to the Boston City Hospital with the diagnosis of probable cerebrospinal meningitis. The following is from the hospital records:

Family History.—Father, mother, one brother and one sister living and well. No tuberculosis in family. *Past History.*—Measles. Run over by a wagon, fracturing no bones, four years ago. *Present Illness.*—Duration, 40 hours. Onset was preceded by a cold lasting two days. Onset with vomiting. Later complained of much pain in left lower quadrant, somewhat relieved by movement of bowels. Then began to have severe headache, followed by pain and rigidity of back of neck. Pain in abdomen prevented sleep last night. Anorexia. Constipation. Micturition not at all day before yesterday, now two or three times in day, not at night. No convulsions. One week ago patient had headache and stiffness of back of neck. *Physical Examination.*—Well developed and nourished. Conscious and rational. Considerable prostration. Pupils equal and react to light and distance. Tongue, moderately heavy brownish coat. Throat not red or swollen. Neck, moderate stiffness. No retraction. Heart, 1.75 cm. to right, 7 cm. to left of median line. Action regular, rapid, sounds clear, good quality, no murmurs. Pulses equal, regular, good volume and tension. Lungs, good respiration and resonance throughout. A few crackles at bases behind. Abdomen rigid all over. Spasm can be overcome to some extent, especially on right side. Considerable general tenderness, more marked on left. Right flanks slightly dull, but tympanitic elsewhere. Nothing made out on palpation because of spasm. Extremities: knee-jerks present and equal. Slight Kernig on right. No Babinski, no clonus. White blood count, 47,100. Temperature 102.0. Pulse, 128. Respiration, 30.

Sept. 24.—Spinal puncture gave 25 cc. of clear, colorless fluid under moderate pressure. Cell count, 70 per cubic mm., of which 90% are lymphocytes. *Sept. 27.*—Temperature day after admission normal, now elevated again. Patient vomited a good deal first three days, yesterday and today retains food.

White blood count: *Sept. 25*, 24,700; *Sept. 26*, 35,600; *Sept. 27*, 14,000; *Sept. 29*, 49,500; *Oct. 5*, 12,800.

Sept. 24.—Urine, red, cloudy, 1018, acid; albumen, a large trace; many leucocytes, few large round cells, red blood corpuscles and coarse brown granular casts. Surgical consultant reports pyelitis or pyelonephrosis. *Sept. 27.*—Blood smear and differential count show nothing. No plasmodia. Patient ran a septic temperature of 98.0 to 100.5 daily for two weeks, then ran a daily average change of a degree for four weeks more (98.0 to 99.0). *Oct. 1.*—Neck still slightly stiff. Belly tender only on deep palpation, more so on left. Urine continues to show large amount of pus daily. *Oct. 5.*—Staphylococcus culture from urine. Patient has occasional vomiting. *Oct. 9.*—Surgeons advise expectant treatment. Abdomen as above, urine unchanged. *Oct. 13.*—Belly still tender at deep palpation. Urine as before. No change until discharge on Nov. 4, when urine still showed a trace of albumin with much pus. General condition good, temperature above 99.0 each afternoon. *Nov. 14.*—Severe attack of pain in abdomen with spasm and tenderness over whole right

flank. Operated upon. Operation shows an acute hydro-nephrosis with some pus formation. Pus evacuated. Patient left hospital Dec. 20. In May, 1916, patient had another attack of pain in abdomen, with temperature 103.0 and pus in urine. At present, February, 1917, patient is still having occasional acute attacks of previous condition.

CASE 2. T. T., 35, married. Surgical record: Aug. 1, 1915, temperature, 103.6; pulse, 120; respiration, 32. Dictation by operator: "Patient came from Carney Hospital with diagnosis of acute intestinal obstruction. Not admitted there because of no beds. Does not seem to be a case of intestinal obstruction, but is apparently a case of gastric or duodenal ulcer. Man was taken suddenly ill yesterday a.m., while at work, with vomiting and extreme pain. Has not board-like abdomen of perforation, but operation seems indicated. Too high a temperature for such early perforation." (Digest of operation.) No free fluid or fibrin about stomach or duodenum. Stomach and duodenum thoroughly investigated and no sign of perforation found. No ulcer found. Gall-bladder slightly distended, otherwise negative. Kidneys and ureters negative. Intestines negative. Appendix a small fibrous cord. No evidence of acute pancreatitis, liver abscess, typhoid fever, volvulus, or intestinal obstruction.

Temperature normal on seventh day, and up to 103.0 on eighth. *Aug. 2.*—Urine report: normal, acid, 1023; albumen, slight trace; no sugar; much pus; few round cells. *Aug. 8.*—Urine report: normal, acid, 1023; albumen, slight trace; no sugar; no cells found in sediment. Seen by medical consultant on Aug. 8; transferred to medical service Aug. 9.

Family History.—Mother and father, wife and two children, three brothers and two sisters living and well. *Past History.*—No previous illness. Wine, one to two glasses; beer, one to two glasses a day; no whiskey. *Present Illness.*—Ten days ago, while at work, was taken suddenly with pain in abdomen and vomiting. Since operation has been coughing considerably. Has some pain in left chest. *Physical Examination.*—Well developed and nourished. Conscious and rational. Slight cyanosis and dyspnea. Markedly prostrated. Profuse perspiration. Eyes: pupils equal, react to light and distance. Mouth: teeth fair; tongue, thick white coat. Throat: slight general redness, no edema or exudate. Neck: no tenderness or rigidity. Lungs: right back from angle of scapula to the base is dull with bronchial breathing and increased voice and whisper; rare crackling râle. Otherwise, lungs negative. Heart: 3 cm. to right, 10 cm. to left of median line. Regular, rapid, good quality pulses; no murmurs. Abdomen: level, soft, tympanitic. From ensiform to umbilicus is a median fresh incision with stitches still present. No tenderness or masses. Extremities: negative; knee-jerks present. *Aug. 13.*—Stitches removed yesterday, wound clean. Patient had chills while on surgical side and has had one daily on the 9th, 11th, 12th, and 13th. Temperature rising to 104.0 and above with actual rigor. White blood count, 13,000. Smear negative for malaria. Physical examination as before, but right back shows flatness and absent fremitus from a point midway between angle of scapula and base downward. Prostration marked. *Aug. 14.*—Brother insists on taking patient home. Urine: Aug. 9, normal, acid, 1020; albumen, slight-

est possible trace, no sugar. Few leucocytes, rare coarse granular cast. Aug. 13, normal, acid, 1012, no albumen, no sugar, many pus cells, rare red blood corpuscle.

CASE 3. S. A., 23, married. Sept. 12, 1916. *Family History*.—Unimportant. *Past History*.—Measles and pertussis; habits good. *Present Illness*.—Pains over whole body. Admitted as typhoid. For two months patient has felt tired, dragged out, but has worked until five days ago. At this time complained of severe backache and general pains "throughout her bones." Next day had severe frontal headache. Vomited once, a day later. Pain through stomach, worse on eating. Burning and stinging pain on micturition, nocturia. Urine never bloody. Vaginal discharge one year ago, lasting three months. Has lost some weight in past three months. Other symptoms lacking. *Physical Examination*.—Well developed and nourished. No cyanosis or dyspnea. Conscious and rational. Eyes: pupils equal, react to light and distance. Ears and nose negative. Neck: no rigidity, tenderness, or glands. Lungs: vocal fremitus is not increased. Sounds normal except for slight tendency toward bronchial type. Whispered voice normal. No dullness. Heart: 2.5 cm. to right, 11 cm. to left of median line. Apex in fifth space just outside nipple line. Action regular, faint systolic murmur at apex. Abdomen: no spasm, masses, or tenderness. Liver just felt. Spleen not enlarged. No rose spots. Some tenderness in right flank. Extremities: no edema, scars, or swelling. Knee-jerks present and equal. No Babinski or Kernig. At entrance, temperature, 101.0; pulse, 130; respiration, 30. Sept. 13, temperature, 103.0; pulse, 115; respiration, 28. Widal, negative; white blood count, 16,000. Sept. 14.—Past two days has had moderate tenderness and some rigidity of neck. Pain in back severe. Several chills, so patient states. Urine shows much pus in catheter specimen. Pyelitis considered probable diagnosis, in which gynecological service concurs. Transferred to Gynecological Service.

CASE 4. M. S., married, housewife. *Present Illness*.—One week ago patient had pains in pelvis like labor pains. Passed some blood. Thinks she is five months pregnant. Took medicine to stop the discharge. Next day was fixed up by a midwife. Ever since pain in both inguinal regions and shooting downward and inward. No difficulty with micturition. Last child three years old. No miscarriages. Seven children living and well. One child died at three months: "could not pass water." *Physical Examination*.—Well developed and nourished. Conscious and rational. Head, eyes, nose, ears, mouth, negative. Neck: no rigidity, tenderness or enlarged glands. Heart: sounds not accentuated. No thrill or murmurs. Action regular. Lungs: good resonance and respiration. Abdomen: rounded, tympanitic, no masses or spasm. Tenderness over both costo-vertebral angles. Liver and spleen not felt. Extremities: no edema, no Kernig, knee-jerks increased. Mar. 15.—Temperature, pulse and respiration normal. White blood count (March 14) 14,000; hemoglobin, 80. Patient presents the following physical findings: slight rigidity and tenderness of neck, with suggestive double Kernig. Marked costo-vertebral tenderness. Urine, Mar. 15, normal, acid, 1011; albumen, trace; no sugar; pus in sediment. Mar.

17.—Normal, acid, 1007; albumen, slightest possible trace; no sugar; pus and squamous cells in sediment. Mar. 19.—Normal, acid, 1009; trace of albumen, no sugar, pus present. Mar. 19.—Temperature, pulse and respiration normal. General condition somewhat improved. Costo-vertebral tenderness less marked, but patient's urine shows much pus. Patient went home against advice.

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- ¹ Musser, John H., Jr., and Hufford, Henry K. R.: Lumbar Puncture for the Relief of Delirium in Lobar Pneumonia. *Jour. A. M. A.*, Vol. lxviii, No. 17, page 1231, April 28, 1917.

Book Reviews.

Dr. Lyman Spalding, the Originator of the United States Pharmacopoeia. Co-Laborer with Dr. Nathan Smith in the Founding of the Dartmouth Medical School and Its First Chemical Lecturer; President and Professor of Anatomy and Surgery of the College of Physicians and Surgeons of the Western District, at Fairfield, N. Y. By his Grandson, DR. JAMES ALFRED SPALDING. Boston: W. M. Leonard, 1916.

The three hundred and eighty pages of this delightful glimpse into the early medical history of New England represent ten years of hard work by a busy practitioner poring through countless old papers that had been preserved in the author's family, and also collateral investigations of the lives of the contemporaries of his grandfather. The book is made up largely of letters written to Lyman Spalding by the eminent physicians of the time, and short biographies of the medical men who are mentioned in the various letters, that are set forth in James Spalding's original and entertaining style, generally from a unique point of view. The letters are reproduced with a great deal of editorial judgment. In spite of the fact that very few of Lyman Spalding's own letters have been handed down, the reader receives a vivid impression both of the personality of this pioneer in the introduction of vaccination, in the teaching of anatomy and surgery, and in the promoting and carrying to a successful issue the project of a national pharmacopoeia, and, as well, a true picture of American medicine as it was practised in the beginning of the nineteenth century.

One must read the book to appreciate its many excellent qualities. The chapters on the public tests of the preventive value of vaccination in 1801 and the final chapter on the origin and prosecution of the pharmacopoeia are perhaps the best. Working in collaboration with

Dr. Waterhouse, Dr. Spalding conducted public tests at Portsmouth in the summer of 1801 to prove the preventive value of vaccination, a year before similar experiments had been begun at Noddle's Island in Boston Harbor, therefore he is entitled to the credit of priority. Spalding got his first idea of a national pharmacopoeia from Dr. Benjamin Smith Barton's "Collections for an Essay towards a Materia Medica for the United States," read before the Philadelphia Medical Society, February 21, 1798. In 1808 Dr. Spalding discussed the pharmacopoeia with Nathan Smith and Alexander Ramsay, and he read the first paper on the subject of a national pharmacopoeia, offering a working basis for its foundation, before the New York County Medical Society January 8, 1817. As a result of this paper, a committee was appointed to advance the project, meetings were held, then a convention with delegates from the different states, Dr. Spalding being the leading spirit; finally the first edition was printed December 15, 1820, less than a year before the untimely demise of its originator.

Dr. Spalding corresponded with many noted friends in the medical profession of this country and Europe and he had a gift at keeping friendships. His grandson has conferred a great benefit on the lovers of medical biography and the profession at large by placing before them in such readable form this valuable account of his life.

Pulmonary Tuberculosis. A Handbook for Students. By EDWARD O. OTIS, M.D. Boston: W. M. Leonard. 1917.

As Dr. Otis says in his preface, this little work is intended primarily for students of the third and fourth years, to use in connection with their clinical work. It is also hoped that the book may not be without value to practitioners who desire to refresh themselves upon this ever-recurring disease.

Dr. Otis is essentially a clinician and one who has spent his whole life in dealing actively with various problems arising from tuberculosis in all classes of society. This book is essentially the life work of a clinician, but of one who has studied and consequently knows history, anatomy and physiology as well as the detail of clinical story of the disease.

The second chapter, on the "History of Tuberculosis," will prove of value to everyone as giving a graphic sketch of development and progress of knowledge concerning tuberculosis. The diagnosis and prognosis are adequately dealt with. The desirability of studying the symptoms of each individual case in order properly to treat the patient and to derive from the clinical symptoms an explanation of the signs found in the chest, is very properly emphasized.

Unlike many treatises, a full half of the book

is devoted to questions concerning treatment. Not only the broad, general lines of treatment are mapped out, but the details dealing with individual annoying symptoms are gone into at such length as give the reader an idea of how the author would meet almost all the troublesome symptoms that are likely to be found in dealing with a long series of cases of tuberculosis. The chapter on "Climate," though short, goes into enough detail to point the way for almost any one seeking climatic cures in the United States. The insistence that financial considerations must always enter into the selection of the climate is well emphasized. The question of prophylaxis is treated from both the patient's and the physician's point of view. A final important chapter is added in regard to marriage and all the problems rising therefrom, which cannot fail to interest all physicians who have to deal with family problems.

To emphasize what was said in the beginning, this book will find its place in the hands of those who wish a real practitioner's experience in dealing with tuberculosis.

Modern Medicine and Some Modern Remedies.

By THOMAS BODLEY SCOTT. New York: Paul B. Hoeber. 1916.

The title conveys in no sense the character of the book. As a matter of fact, the book is a small one of some 160 pages, and represents random but, nevertheless, interesting notes on disorders of the heart, arteriosclerosis, and bronchitis and asthma, with a chapter entitled "Therapeutic Speculations and Doubts," presumably to cover the second part of the title. Dr. Scott is an English practitioner and evidently an able one, and his views on some of the problems of medicine are interesting.

The Adolescent Period. Its Features and Management. By LOUIS STARR, M.D., LL.D. Philadelphia: P. Blakiston's Son and Company. 1915.

This book is intended as a complementary volume to the monograph on "Hygiene of the Nursery," by the same author. It aims to present, for parents and others responsible for the education of the young, an outline of the physical and psychical changes to be expected during puberty and adolescence, and of methods of management that may be followed to counteract the possible dependent evils. The chapters deal respectively with the phenomena of growth, physical education, the diseases of adolescence, the faults and animal tendencies of adolescents, menstruation and sexual enlightenment. On the whole, the book is sensible and temperate in its statements and in its treatment of the perplexing problems of so-called sex hygiene.

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THE NATURE OF HEREDITY.

WHILE the theories of heredity are undergoing marked changes of late, and the number of conditions or diseases in which there are evidences of distinct hereditary transmission are becoming fewer and fewer, the changes are rather in the nature of heredity than in the actual fact of hereditary transmission. With few exceptions, no diseases or disturbances are transmitted from parent to offspring *in utero*. Yet it is believed that every disease or deficiency existing in the parent stem at the time of conception finds its reflection in the offspring in the form of a hereditary predisposition to such conditions. In all likelihood, the contact with the conditions or with the environment that produced the disease in the parent stem need not be nearly so positive as in those not having this predisposition, in order to effect similar pathological

changes in the offspring. Practically speaking, the only disease known to have a definite hereditary transmission *in utero*—and that is the test of real hereditary transmission—is congenital syphilis, and a constitutional disturbance known as hemophilia. In the latter, the bleeding tendency has a distinct scheme of transmission. It passes from affected ancestor through immune female offspring, and then usually affects a male offspring. Even in mental and associated conditions, where the belief in heredity is still very strong, there is little evidence of definite transmission of a condition *in utero*. Of course it is almost axiomatic to say that in every mating no better, or different, species can be produced than the ancestors. A pure idiot could probably produce only a pure idiot. Yet there are a few notable examples in history of marked defectives producing geniuses, and except for the modern belief that geniuses are peculiar, and manifest a definite defective mental constitution, these cases would tend to disprove many of the notions concerning hereditary mental conditions. According to the Mendelian doctrine of heredity, unless both parents are distinctly defective, not all the offspring will share manifestly in the defects of the ancestors. Some assume only the dominant traits, while others only the defective ones. According to Mendel, this occurs in the proportion of three dominant offspring to one defective or recessive one—that is, if there are that many offspring. Otherwise, only the dominant or only the recessive may come into being. Yet either the recessive or the dominant offspring have dormant in them the characteristics of the other elements which may become activated in some future generations and which accounts for the birth of a single defective in an otherwise normal line. This recessive characteristic has never been wiped out, but remains to be the ancestor of a so-called "throw-back." In the same way, the genius of a defective line is the surviving dominant element in an otherwise defective line.

In tuberculosis, for example, the offspring of the tubercular parents may never become tubercular if these offspring happen to be the dominant proportion of this mating. But the offspring who represent the recessive element may develop tuberculosis, not by direct transmission, but rather because their recessive con-

stitutions have a special affinity for tubercle bacilli. Practically, however, the offspring of tubercular parents are liable to tubercular infection in proportion to the time at which they are removed from contact with their tubercular parents and from contact with any environment or condition that would lend itself to tubercular infection. Tubercular children are infected by contact and not by direct transmission *in utero*, the disease perhaps to be dormant till some future time. It seems that the recessive offspring of tubercular ancestors have a sort of anaphylactic sensitiveness to tubercle toxin whenever brought in contact with it. Any heredity that they may have lies only in lowered resistance to this particular infection. In them the reaction is usually rapid and severe. Yet while this sensitization is apparent, it is difficult to say wherein or in which organ this sensitization is transmitted.

In keeping with the marked developments in endocrinology, the question of the influence of the glands of internal secretion has also invaded the field of heredity. It has been advanced that the glands of internal secretion are mainly concerned in meeting the brunt of this defective heredity, in that they are rendered deficient to some extent in the production of the materials necessary to uphold natural immunity and to prevent this sensitization. The rôle of tuberculosis in the so-called Addison's disease is well known. Here the disease is distinctly a tubercular disease of the adrenals. The mental and emotional disposition of tubercular individuals—that is, their peculiar spirit of cheerfulness and hopefulness—savors very much of a gland overactivity somewhere, because of gland deficiency elsewhere. The control of the secretions from the various glands of internal secretion depends upon an antagonistic control of the other glands of the system. The hyperactivity of the reproductive organs in advanced tuberculosis points in the same direction. The relation of gland development to mental development, even aside from that associated with the thyroid, has been much discussed, and it seems that much of the hereditary diatheses must soon be definitely associated with gland conditions. It is for this reason that organotherapy looms so large in conditions associated with heredity, and although organotherapy may seem to be the rankest empiricism, it does appear to be the only rational therapy in a great many conditions of unknown origin.

DO DEMENTIA PRECOX CASES RECOVER?

THE general conception of dementia precox in the recent, or Kraepelinian era of psychiatry, was that it was for the most part an irrecoverable disease, but that a few patients did return to some sort of normality. The catatonic form showed the largest percentage of recoveries and the hebephrenic next, while practically none of the paranoid cases got well. But now that many of the leading exponents of psychiatry have entered into the Freudian era, a new conception of the disease has gained ground. The psychoanalytic, or perhaps it would be better to call it the interpretative, school of psychiatry, looks upon dementia precox as a regression of the individual back towards primitive levels—if the regressive process takes him back to an archaic level, that is, to an ontogenetic level analogous to a very low phylogenetic one, the prognosis is poor. Short of that, there is hope for recovery, depending, of course, on the duration and vigor of the regressive tendency, conditioned somewhat by various collateral circumstances, such as physical health, environment, nature of the therapy undertaken, etc.

It all goes back, of course, to an ancient human disorder, the labelling mania: "A new set of tags, and presto! we have a new theory, a new armament of criteria, a new philosophy," says Mencken.*

From the time of Hippocrates, psychiatrists have recompensed themselves for the inadequacy of their actual knowledge of disease of the mind by a wealth of descriptive terminology. This tendency reached its legitimate height with Kraepelin and has been carried to excess by Ziehen. But even Kraepelin, if our memory serves us correctly, has been quoted as saying that a psychiatrist should be satisfied if he could diagnose one-half of all the mental cases he sees.

Kraepelin, by the way, is responsible for the dementia precox group. It has been alleged by the hypercritical that, after diagnosing all the cases he possibly could, he threw the rest together and proclaimed them a disease entity. Thus the conception of dementia precox, as held by Kraepelin and his followers, is sometimes termed, "Kraepelin's waste-basket."

There seems to be a growing tendency now-

* "The Plague of Books," by H. L. Mencken. *The Smart Set*, June, 1917.

adays to hesitate to label a case dementia precox unless it shows a definite picture of emotional disharmony, looseness of thought and judgment, failure of attention and retention, and usually hallucinations and silly delusions, together with a tendency to deteriorate. In other words, the old familiar institution-precox is coming in certain quarters to be regarded as the type of the disease. It follows, then, that some cases which exhibit many or all of the symptoms usually regarded as diagnostic of precox, but which run a short course and make a more or less complete recovery, do not fit in with this scheme, and are coming to be called "allied to dementia precox."

In other words, recovery is being made the diagnostic criterion; and is this not a species of intellectual cowardice? Far be it from us to insist that every case of mental disorder be scrutinized hurriedly, labeled this or that, and thrust into a pigeon-hole; there are many cases which exhibit such anomalous symptoms that it is practically impossible to come to an absolute conclusion as to the group to which they belong. But we do protest against a revision of diagnosis based on recovery alone. Every alienist of any experience at all knows many patients who have at one time exhibited practically all of the typical symptoms of dementia precox—cases which the most fervent psychoanalyst would pass as such—and which have recovered after lengthy detention in a hospital. Indeed, there is one such case in the literature, where recovery was reported after thirty years' residence in the hospital. Let us be frank and above-board in our methods. If we saw a forty-year-old patient who had had a chancre, ten years before, whose blood and spinal fluid gave a complete positive reaction with the Wassermann test, the protein content of whose spinal fluid was increased, who had fifty cells per cubic millimeter of spinal fluid, who showed a Lange colloidal gold curve of 5 5 5 4 4 3 2 1 1 0, and who exhibited all the physical and clinical signs of general paresis, we should not change our diagnosis simply because his symptoms disappeared under treatment. We should call it a remission, and wait for eventualities. But if the case went on five, ten, twenty and thirty years without recurrence we should call it a cure if all the text-books in all the libraries in the land said that general paresis was incurable. So let us exhibit a scientific attitude towards dementia precox. If a

case which we have decided, after careful study, is dementia precox, recovers, let us be grateful that the disease is not absolutely hopeless and not take cover behind the dubious shelter of mistaken diagnosis.

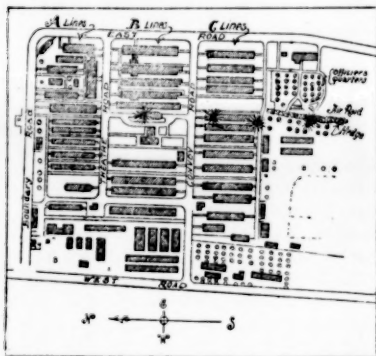
AMERICAN MEDICAL CASUALTIES IN FRANCE.

We have at last begun to receive authentic accounts of the casualties already sustained by American physicians in service in France. Some of the stories narrating these casualties are elaborate in detail, others laconically brief. Among the earliest of the American physicians to be wounded was Dr. Howard F. Keating of Philadelphia, first lieutenant in the United States Medical Corps, who was injured during an air raid on the night of September 24. On October 5, Dr. P. G. Hamlin, first lieutenant of the United States Medical Reserve Corps, and a resident of Richmond, Va., was wounded while engaged with the British forces. And on October 18, Dr. Archibald Graham, first lieutenant of the United States Medical Officers' Reserve Corps, and attached to the British forces, received a severe gunshot wound of both thighs. He was a resident of Paterson, N. J., and had been attached to a base hospital in England.

Dr. Patrick S. Burns of Providence, R. I., has been thrice aboard torpedoed steamers, from which he has each time safely escaped. He was on the *Iberian*, which was sunk in July, 1915; on the *Canadian*, sunk in the spring of 1916; and on the *Devonian*, torpedoed on August 21, 1917, off the north coast of Ireland.

Perhaps the earliest of the casualties in which an American physician was killed was the bombing of the United States Army Base Hospital No. 5, the Brigham Hospital unit, on the night of September 9, 1917. Early accounts of this episode reported the death of First Lieutenant William T. Fitzsimmons, of the United States Medical Reserve Corps, who had joined the unit from Kansas City and was at first unknown in Boston. The description of the attack in which he received his death and in which two others of the unit were killed and twenty wounded, cannot be better told than in the vivid words of a letter from Dr. Harvey Cushing, recently received by Dr. E. H. Bradford, dean of the Harvard Medical School. The

accompanying illustration shows the ground floor plan of the hospital and the location in which the bombs struck.



"It was shortly after 11 p.m., and having had a rather strenuous two days, our people were just about turning in, most of the officers were in or about their tents, and the wards for the most part had quieted down for the night. Just where this particular raider had been, or was bound, I do not know, but he evidently was flying in a northerly direction. He had dropped a bomb, luckily in an open place, in the outskirts of one of the hospitals to the south of us; then a torpedo—fortunately a 'dud'—in the hospital adjoining us. A warning had been received, possibly some fifteen minutes before, of his approach: the lights of the camp and district were extinguished, so that by those who were awake it was, of course, known that a raider was in the neighborhood, and the whistle of the torpedo nearby made those who were aware of its significance prostrate themselves. Unhappily, all did not do so, and in a few seconds the next two bombs dropped within ten feet of each other, near the hedge back of the officers' compound.

"Poor Fitzsimmons had been roused, had come to the door of his tent and called to one of the sergeants nearby, as one of the bombs dropped practically at his feet. The poor fellow with his tent was literally blown to pieces, and fortunately could never have known what had occurred. McGuire, another Kansas City man, in the tent next Fitzsimmons, was in his bunk, out of which he was practically blown, receiving only three penetrating wounds—shoulder, arm and thigh—a fortunate escape, for his tent was riddled with holes—someone counted four hundred—and the condition of his possessions can be imagined.

"These bombs were of the 'daisy-cutting' variety, with low-flying fragments which scatter widely, some of the missiles from these first two bombs even reaching and penetrating our wood-

en mess hut, one hundred and sixty feet away; and some were found in the adjoining hospital the next day.

"Lieut. Rae Whidden, who, though not a member of our original group, has been attached to us for some time, was sitting in his tent, writing, and received a penetrating chest wound; and Lieut. Smith similarly a fragment in the knee-joint. Fitz, fortunately, was away. Morton, who had had a lesson from his experience with us in a more forward area, threw himself out of his tent to the ground when he heard the whistle of the bomb, and escaped with a scratch on his wrist, though fragments went low enough to penetrate his water pitcher standing on the floor. Indeed, every one of the officers had his own little experience, more or less tragic, or—now that some time has elapsed—regarded as more or less amusing.

"The third bomb struck at the end of one of the five-marquee tent wards, in what are called the 'C-Lines,' and the next one directly on one of the marquees of this same ward, fatally wounding an orderly, one of our original enlisted men, named Tugo, the explosion being severe enough to knock down the nurse in charge, Miss Parmelee, who was standing beside him. Fourteen British Tommies were re-wounded in this and in the adjoining ward.

"The fifth and last of the bombs made a direct hit on the reception tent, and it is lucky we were not 'taking in' at the moment, for when a convoy of wounded arrives, this is the most congested spot in the hospital camp, with ambulances, stretcher-bearers, and medical officers in addition to the crowd of walking and lying wounded. Sergeant Edwards and three other men were on duty there. Edwards saw the earlier explosions, shouted a warning, leaped from the chair he was sitting in, and rushed to the end of the tent. Our bugler, Woods, a regular, attached to us at Fort Totten, got up from the floor, thanked him for the seat he had vacated, sat down, and was instantly killed; as was also Rubino, another regular. Two other privates in this group, Mason and McCloud, were badly wounded, and the latter, who happened to be standing, has had to have a double thigh amputation—in fact, three amputations, the last a high one for a severe secondary gas infection. That he is recovering is a great credit to Cutler's skill. Flying fragments from these bombs, as from the first two, spread widely, some of them reaching as far as the little laboratory where Stoddard was intent on his job and didn't budge, not fully realizing what had smashed his sash and broken his window.

"All of this occurred in a few seconds' time, and out of a clear moonlight sky; the kind of a sky a raider chooses, for flying is perfectly safe, and an uncamouflaged hospital must show up plainly on such a night, whether it is lighted or not.

"Then came the work, and then the Unit showed what it was really made of. There were

many serious, and some severe wounds, needing immediate attention; and it is bad enough for the staff to have a lot of urgent cases thrust upon them when they receive—as we usually receive—sufficient warning of a convoy. The operations, moreover, had to be carried out by the light of candles and lanterns, for there was no more current that night; and not a few of them were urgent ones for hemorrhage. Everyone, of course, took a hand, and that there was so much to do was probably a blessing, for it certainly must have helped to crowd out all other thoughts.

“There were many instances of presence of mind, of self-sacrifice. It is hardly proper to ask about them or to single them out. I may mention one or two examples that have come to me. Miss Parmelee, who had such a close call, went right to work on the re-wounded in her ward, and found, when she tried to take a patient's pulse, that her watch had been cut away from its strap. In the morning she reported to the operating room to have a small fragment removed from her eyelid; there were about a dozen holes through her jersey and wraps. Mason, one of the men who had been in the reception tent, got to work immediately with the others, carrying wounded, and not until some time after was it noticed that he, too, was wounded; he had, indeed, a penetrating wound of the skull.”

Dr. Fitzsimmons, prior to joining Dr. Cushing's unit, had spent a year doing hospital work in France. He was a graduate of the University of Kansas. Dr. Rae Wygant Whilden, of New York City, is well known to many friends in the Boston profession. He graduated from the Harvard Medical School in 1911. Dr. Thaddeus D. Smith is a resident of Neenah, Wisconsin, and Lieutenant Clarence A. Maguire, of Kansas City, Mo. It is an element of melancholy irony that Dr. Fitzsimmons had been recommended for promotion to a captaincy on the very day when he was killed. A bill has been introduced into the National Congress to enter his name on the military records with the promotion he would have received, had he lived. He was the first American officer to give his life in the war.

To Boston physicians the most grievous loss thus far sustained in the war is the death of Dr. George Plummer Howe, first lieutenant in the Medical Officers Reserve Corps, well known and remembered and beloved by many friends in the profession of this city. An account of his life and death was published in the issue of the JOURNAL for October 25, 1917. He was killed in action on September 28, while on duty with the

British forces in France, but of the exact circumstances of his death no reliable account has yet been received. Dr. Howe sailed for Europe at the earliest opportunity after the United States entered the war, and narrowly escaped death on the *Mongolian*, the vessel aboard which the fatal shell explosion, killing two nurses, took place shortly after leaving port. Dr. Howe was standing near the gun at the time the explosion occurred. He had been refused by the American Medical Reserve Corps on account of defective eyesight, but obtained a commission in the British army as battalion medical officer in the Tenth Royal Fusiliers.

In another column of the present issue of the JOURNAL is published the memorial notice of Dr. Howe, prepared by his chapter in the Aesculapian Club of Boston, of which he was one of the founders. The gallantry with which Dr. Howe met his end, though as yet unknown, will be taken for granted by all who were acquainted with his brave and stable disposition. To them his living personality, which can never become less vivid with time, is admirably recalled in letters written to friends shortly before his death. Two of these are here published for the first time by courtesy of a Boston physician, to whom they were addressed.

Sept. 16, 1917.

When you gave your dinner to the Dirty Dozen most everybody had something interesting to tell but yours truly. Since that time things have moved with me a bit. I am now battalion medical officer to the 10th Royal Fusiliers, and like the job.

Surgeon to an infantry battalion in war is not my job, medically speaking. While I have learned a lot that I did not know before, none of it is any use from the point of view of civil practice. I really think I am popular with officers and men of my battalion. I am heavy-weight wrestling champion, and am not so bad at putting my horse over the jumps. We run a very good mess, and do not let ourselves suffer for thirst. I have not yet been in a big push, but have had a hand in some small trench raid affairs and been shelled a bit. At present we are battalion in support—just far enough back so that there is no excitement and near enough so that I can't have up my horse and go for a ride as something might happen any time.

A damn 12 m. howitzer on my right is firing once every 5 minutes and makes a noise that might bust your eardrums. The Bosche is making for a captive balloon behind us with shrapnel—mostly falling short.

It is a beautiful September afternoon. I expect that the war is good for another year

yet, unless it ends in a standoff. If the papers tell you that Fritz is all in, don't believe it. He is having a pretty bad time but still has considerable pep left.

When I was in London early in June I saw Kidner—Jim Graves—Goldthwait and Fred Murphy. In Boulogne I saw Frank Palfrey (damn that 12m howitzer); I can't hear myself think.

When I came out they asked us what work we wanted. I said I wanted a seat in the front row, so I was sent at once to a field ambulance for training. While there I acted as battalion medical officer to the Divisional Engineers, then to the 13th Fusiliers during leaves of their regular officers, then was permanently appointed to the 10th and expect to remain with them to the end of the show. If I don't, it won't be my fault. I have been in fine health all the time except that I have boils whenever we are up front where you can't wash properly. I think my job beats any base hospital game hollow.

Sept. 27, 1917.

It seems likely that we move forward tonight. There is a big attack on, as you doubtless know from the papers. So far we have gained and come out excellently for losses, from all I can hear. Of course if you are not yourself in a show you know very little of what is going on, and even if you are, you only know how it is near you. The difficulty with the new German defense is not to gain ground, but to hold it after you get it, as the Germans hold their front line lightly—have every landmark registered for their batteries and yield easily to the first assault, then pour fire on our infantry and batteries coming up to take position. We shall probably go in as holding troops and will probably get all that is coming to us.

It will be my first chance at a real battle, and I must say I rather look forward to it.

The papers gas a lot about French .75s, but if you want to see real artillery and really first-class artillery work, call on the B. E. F. There never was anything like it before and won't be again very soon. One of the German prisoners remarked that we did not know what it was like to be under real artillery fire, and he was about right, too.

Yours sincerely,
PETER HOWE.

In a letter to another Boston physician, now serving in France, the colonel commanding the British field hospital, with which Dr. Howe was stationed for a time before joining the Fusiliers at the front, speaks of him as follows:

"I was very grieved to hear this afternoon that poor Howe was killed yesterday by a shell. Lieut. Howe left us about a month ago, when he took medical charge of a regiment.

I have not yet heard full details of his death, but understand that he was standing talking with about half a dozen others, when a shell fell in their midst, and poor Howe was killed instantaneously.

He was a fine brave fellow, and is a great loss to our Division."

American medical casualties in the war are as yet few, but they have involved already the bravest and best of our colleagues and friends. There will be many more and many, perhaps, less romantic and gallant in circumstance. Those who have been first to go have shown the path of duty, which it may be the occasion for any of us to follow. It is matter for gratitude that the American medical profession, true to its ideals, has shared in the earliest sacrifice of life, as well as of labor, in the service of country and in the cause of mankind.

MEDICAL NOTES.

ALLEGED INCREASE OF CANCER.—In the *Journal of Cancer Research*, Vol. ii, July, 1917, Walter F. Willeox of Cornell University has written an article challenging the common belief that cancer is on the increase. After quoting exhaustively from statistics, he summarizes his conclusions as follows:

The reported mortality from cancer is increasing in almost every part of the world from which reports exist, but the real mortality, if it is increasing at all, is certainly not increasing with equal rapidity. About one-tenth of the apparent increase, he believes, may be proved as due to changes in sex and age composition. The remaining nine-tenths of the increase are explained by improved diagnosis. To support his belief he puts forward various convincing reasons which must be taken into account in any intelligent and thorough understanding of the cancer situation.

WAR NOTES.

TO THE OFFICERS OF THE MEDICAL RESERVE CORPS, U. S. ARMY, INACTIVE LIST.—Word received from the Surgeon-General of the U. S. Army conveys the information to officers of the Medical Reserve Corps of the United States Army, inactive list, that assignment to active duty may be delayed, and that they are advised to continue their civilian activities, pending receipt of orders. They will be given at least 15 days' notice when services are required.

PROMOTION OF DR. HUGH CABOT.—It is announced that Dr. Hugh Cabot of British Base

Hospital No. 22 has been made lieutenant colonel of the Royal English Medical Corps. He has succeeded Lieut.-Col. Sir Allan Perry as commanding officer of the Hospital. This is in addition to being chief surgeon, which position he has held for some months. Dr. Fred Jouett of Cambridge will soon sail for France to join the unit.

WAR RELIEF FUNDS.—On Nov. 10 the totals of the principal New England war relief funds reached the following amounts:

French Wounded Fund	\$293,185.31
Armenian-Syrian Fund	246,376.58
Surgical Dressings Fund	132,834.99
War Dogs' Fund	1,839.25

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATES IN BOSTON.—During the week ending Nov. 10, 1917, the number of deaths reported was 236, against 255 last year, with a rate of 15.93, against 17.49 last year. There were 26 deaths under one year of age, against 34 last year.

The number of cases of principal reportable diseases were: diphtheria, 125; scarlet fever, 32; measles, 47; whooping cough, 26; typhoid fever, 4; tuberculosis, 49.

Included in the above were the following cases of non-residents: diphtheria, 21; scarlet fever, 5; tuberculosis, 4.

Total deaths from these diseases were: diphtheria, 5; scarlet fever, 1; measles, 2; whooping cough, 1; typhoid fever, 1; tuberculosis, 23.

Included in the above were the following non-residents: diphtheria, 1; tuberculosis, 1.

THE FRAMINGHAM EXPERIMENT.—The community health experiment at Framingham is to give, the coming winter, under the direction of its executive officer, Dr. Donald B. Armstrong, a series of lectures and clinics for Framingham physicians, to be given by physicians and scientists on special phases of the tuberculosis program. At the same time it is planned to arrange for public meetings on these subjects so that the townspeople may be given the opportunity to hear from these distinguished persons facts and information regarding the care of those matters necessary to the building up of a model health community.

PREVALENCE OF DIPHTHERIA.—Because of the unusual number of cases of diphtheria that have appeared in Boston and the State, the Boston Health Department has sent out a letter to physicians, asking for particular care at this time in the detection of the disease. The letter in substance is as follows:

"Diphtheria is unusually prevalent in Boston, as well as in other parts of the State. Phy-

sicians should isolate and take cultures from the nose and throat in every suspicious case. Antitoxin should be given at once, without waiting for laboratory findings. A positive laboratory report is conclusive evidence of the presence of diphtheria, but a negative report is never conclusive of the absence of diphtheria. There are various factors, as overgrowth of other organisms, etc., that may prevent diphtheria bacilli from being demonstrated in a laboratory examination.

Please advise parents to isolate every child with nasal discharge, sore throat, or indefinite symptoms, as these are often proving to be diphtheria."

AN OPENING FOR PHYSICIANS.—In a letter addressed to the editor of the *Weekly Bulletin*, Dr. Donald B. Armstrong, executive officer of the Community Health Demonstration, calls attention to three full-time medical positions now open at Framingham, Mass.:

"These include a public school medical supervisorship, a medical position in one of our larger industries, and a medical position at the head of our industrial medical organization for the community as a whole. The first two positions will pay \$2500 a year and the third position \$3500.

We would, of course, prefer to secure men with school or industrial experience for this work, but owing to the pressure of present conditions it may be necessary to take a young man with sound medical background and have him develop with the work.

I would appreciate very much being placed in touch with any one who may come to your attention. We are very anxious to fill these positions at once; our inability to do so to date is considerably retarding the progress of the Community Demonstration."

The Massachusetts Medical Society.

OFFICERS OF THE MASSACHUSETTS MEDICAL SOCIETY, 1917-18.

<i>President</i>	
SAMUEL B. WOODWARD	58 Pearl Street, Worcester
<i>Vice-President</i>	
GEORGE P. TWITCHELL	17½ Federal Street, Greenfield
<i>Secretary</i>	
WALTER L. BURRAGE	282 Newbury Street, Boston
<i>Treasurer</i>	
ARTHUR K. STONE	44 Fairfield Street, Boston
<i>Librarian</i>	
EDWIN H. BRIGHAM	Brookline
<i>S The Fenway, Boston</i>	

STANDING COMMITTEES.

<i>Of Arrangements</i>	
JAMES H. YOUNG, <i>Chairman</i>	19 Baldwin Street, Newton
<i>On Publications and Scientific Papers</i>	
GEORGE B. SHATTUCK, <i>Chairman</i>	183 Beacon Street, Boston
<i>On Membership and Finance</i>	
CHARLES M. GREEN, <i>Chairman</i>	78 Marlborough Street, Boston

On Ethics and Discipline
J. ARTHUR GAGE, Chairman 64 Central Street, Lowell
On Medical Education and Medical Diplomas
HAROLD C. ERNST, Chairman
 240 Longwood Avenue, Roxbury
On State and National Legislation
SAMUEL B. WOODWARD, Chairman
 58 Pearl Street, Worcester
On Public Health
ENOS H. BIGELOW, Chairman
 P. O. Box 213, Framlingham

NOTES FROM THE DISTRICT SOCIETIES.

DISTRICT CORRESPONDENTS.

Berkshire, A. P. MERRILL, M.D., Pittsfield.
Bristol North, ARTHUR R. CRANDELL, M.D., Taunton.
Bristol South, EDWIN D. GARDNER, M.D., New Bedford.
Essex North, T. N. STONE, M.D., Haverhill.
Essex South, H. P. BENNETT, M.D., Lynn.
Hampden, LAURENCE D. CHAPIN, M.D., Springfield.
Hampshire, E. E. THOMAS, M.D., Northampton.
Middlesex South, WILLIAM C. HANSON, M.D., Belmont.

SUFFOLK DISTRICT MEDICAL SOCIETY.—A meeting of the Suffolk District Medical Society was held on October 24 at the Boston Medical Library. In spite of the rainy weather, about eighty members were present. The president, Dr. H. F. Vickery, was in the Chair. In addition to the regular business of electing nominating and auditing committees, it was voted that the Chair, in accordance with the request of the Surgeon-General, appoint a committee of ten to ascertain the condition of those disabled persons in Suffolk County who have successfully taken up new occupations, and that this committee be supplied with funds. It was voted also that the Chair appoint a committee to study the problem of caring for the families of medical men in the Service. The names of these committees will be printed in a later issue of the JOURNAL.

Dr. J. Whitridge Williams of Baltimore read a paper on "Repeated Cesarean Section." This was discussed by Drs. Reynolds, Newell, Mason and Konikow.

The meeting was followed by refreshments.
 GILBERT SMITH, Secretary.

Miscellany.

RESOLUTIONS OF THE CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA.

In last week's issue of the JOURNAL we commented editorially on the recent session in Chicago of the Clinical Congress of Surgeons in North America. On October 23, prior to this meeting, the following resolutions were adopted unanimously at a meeting of all the state committees (with the exception of Maine and Delaware) of the medical section of the Council of National Defense. These resolutions urge im-

mediate action to provide for at least six months of intensive military training of all young men in their nineteenth year, to become operative as soon as the army cantonments are available. They also recommend physical training in schools.

Whereas, The experience through which the United States is now passing should convince every thoughtful person of the necessity for the universal training of young men, not only for the national defense in case of need, but also to develop the nation's greatest asset—its young manhood—in physical strength, in mental alertness, and in respect for the obligations of citizenship essential in a democracy, therefore be it

Resolved by the State Committees of the Medical Section of the Council of National Defense that they strongly urge the adoption by our government at this time of a comprehensive plan of intensive universal military training of young men for a period of at least six months, upon arriving at the age of nineteen years; and that this body also support the movement to secure the introduction into public schools of adequate physical training and instruction;

Resolved, That the members of each State Committee immediately take active steps to insure public support for the subject of these resolutions through the newspapers, through public meetings and through the appointment of committees in each county; also that copies of these resolutions be forwarded to the senators and members of Congress in their respective states, with a personal request that favorable action be taking at the coming session of Congress upon a measure following the principle of the Chamberlain bill and to become operative as soon as the army cantonments are no longer required for the training of the forces in the present war;

Resolved, That each State Committee from time to time report to the Medical Section of the Council of National Defense as to action taken and progress secured in their several states.

At the session of the Congress on October 25, 1917, the following similar resolutions were adopted:

Whereas, The experiences of the nation convince us of the necessity for universal military training, to furnish qualified men for defense, to strengthen manhood and mental poise, and to make for a more efficient citizenship, and

Whereas, We believe it will democratize youth and furnish discipline while developing physical force and endurance, and will produce better fathers and workers for the ranks of peace.

Therefore, Be it resolved that the Clinical Congress of Surgeons at its eighth annual session urges upon Congress at its coming session the passage of a measure along the general lines of the Chamberlain bill for universal military training, and that the cantonments now used by the National Army be utilized, if possible, for such work.

TECHNOLOGY MEN IN HEALTH WORK.

THE appointment of Burt L. Rickards, M.I.T. '99, to the post of assistant deputy commissioner of the State Board of Health of New York, suggests that during the summer there has been quite a moving of Tech sanitarians to higher places. Mr. Rickards, who was, nine or ten years ago, head of the bacteriological laboratory of the Boston Board of Health, has been since that time in commercial bacteriology in Urbana and in Boston, and goes now to a most important place in one of the strongest health organizations in the country. It is important to note that the position was one in the Civil Service, and that Mr. Rickards headed a long list of competitors.

Professor S. M. Gunn, '05, of the faculty of the Institute has gone to France recently, where he is associated with Livingston Farrand and Professor Severance Burrage, '92, in tuberculosis work among the civil population. He is associate director of the American Anti-Tuberculosis Commission of the International Health Board, with an office on the Rue de Rivoli, Paris.

Two of the Tech alumni have gone within the past month from New England to the West Coast, where they are in charge of two of the great districts into which California is divided for health administration. These are E. E. Ingham, '14, and R. N. Hoyt, '09. Mr. Ingham has been instructor at the Institute and was the pivot about which the recent important Massachusetts State Health War Conference revolved, while Mr. Hoyt was first health officer in one of the Oranges in New Jersey, coming thence to the cooperative health administration of Wellesley and adjoining towns, a position which he resigned to become health officer of Manchester, N. H. Mr. Hoyt is to have the central district of California, including San Francisco, while Mr. Ingham will have headquarters probably at Riverside.

Professor George C. Whipple, '89, and Professor Charles E. A. Winslow, '98, the latter now at Yale, are returning from the Sanitary Mission to Russia, and the former will take up again his classes at Tech about November 1.

Mr. C. E. Turner, instructor in biology and public health, Associate of the Sanitary Research Laboratory, has been making special field investigations on behalf of the State Department of Health in Maine.

Professor S. C. Prescott, '94, has been invited to undertake special work upon the conservation and salvage of foods by the Food Division of the Medical Department of the U. S. Army, and has already begun his work.

Mr. Horowitz, instructor in biology and public health, has been continuing during the summer his sewage investigations at the Experiment Station of the City of Brooklyn in New York. Professor Stiles was recently invited to give his whole time to food work under the Med-

ical Department of the Army, but was unable to accept because of his urgent duties in teaching.

Mr. Malcolm Lewis, a graduate of the Department of Biology and Public Health, in 1914, has resigned his position as health officer of South Orange, N. J., and become epidemiologist to the State Department of Health of New Jersey, with an office at the State House in Trenton. The large concentration of men at Camp Dix has thrown upon the State Board of New Jersey unusual problems, some of which will be dealt with by Mr. Lewis.

James A. Tobey, late assistant in the Military Department, M.I.T., and a graduate of the course in sanitary engineering, has resigned his position as health officer of West Orange, N. J., to become assistant to the Bureau of Sanitary Service, American Red Cross, in the work of this Bureau around some of the Southern cantonments.

Professor Gunn's work as secretary of the American Public Health Association and editor of the *American Journal of Public Health*, has been assumed by Mr. A. W. Hedrich, late health officer of East Chicago, and last year a member of the Harvard-Technology School for Health Officers.

Mr. F. J. Funk, formerly assistant in biology and public health, has become one of the chief sanitary inspectors of the Bureau of Sanitary Service, American Red Cross, with an assignment for duty at Louisville, Ky.

Mr. A. S. Bedell, a graduate student last year in biology and public health, has been appointed assistant bacteriologist to the State Board of Health of New York.

Mr. F. Bernard, when last heard from, after training at Plattsburg, was commissioned second lieutenant, and had been assigned to work in the Quartermaster's Division.

Mr. J. O. Connolly, a graduate of the course in sanitary engineering, in 1917, a Master of Science, after work with the State Board of Health during the summer, has been assigned for duty in the extra-cantonment zones, under the American Red Cross, Bureau of Sanitary Service.

News has lately been received from Mr. George W. Bakeman of Course XI, who is still doing Red Cross work at Petrograd. He was recently offered the position of vice-consul.

Mr. Philip S. Platt, a former student, after sanitary work in Belgium, in Petrograd, and in Vladivostok, has recently done similar service in France.

The absurd story about women being just now admitted to the Harvard-Technology School for Health Officers has come to the surface again in connection with a reported opening of the doors of the Harvard Medical School to women. The truth is that as soon as the question of women in the Health School was brought to notice,—and that was only a month or two after the opening of the school in 1914,—it was

decided that they are eligible to the Harvard-Technology School according to the Technology principle of admitting students without reference to sex or race. There are certain courses, however, usually given in the Harvard Medical School to which women are not admitted, but the coöperative school will accept the equivalent of this work if performed elsewhere. Women can and practically could always take the Harvard-Technology Health School work.

IN MEMORIAM

GEORGE PLUMMER HOWE, A.B., M.D.

FIRST LIEUTENANT, ROYAL FUSILIERS, BATTALION M.O., B.E.F.

Æsculapian Club, Chapter 1904.

GEORGE PLUMMER HOWE was born in Lawrence, Massachusetts, December 11, 1878. He went to St. Paul's School, Concord, New Hampshire, and graduated from Harvard in the year 1900 and from the Harvard Medical School in 1904. During the years 1904-1906 he served as surgical house officer at the Boston City Hospital. He then joined the Anglo-American Arctic Expedition as surgeon, and spent the next sixteen months on the north coast of Alaska, returning to San Francisco on a whaler in the fall of 1907. After this he practised medicine for two years in Lawrence, but becoming interested in archaeology in 1909 he entered the Harvard Graduate School to study this subject. He organized an expedition and spent the summer of 1911 in Yucatan. Since that time he practised medicine in Boston, specializing in diseases of the skin and serving on the staff of the Boston City and Carney Hospitals.

September 11, 1911, he married Marion Dudley Endicott. In May, 1917, as a member of the American Medical Reserve Corps he went as an unattached volunteer with rank of first lieutenant, to serve with the British forces, and was assigned to the Royal Fusiliers as battalion medical officer.

He was killed in action September 28, 1917.

Since its inception, George Howe had been a deep and earnest student of the present war. While filled with a wholesome respect for German efficiency, he was always deeply and sincerely devoted to the cause of this country. Of a naturally bold and venturesome spirit, he found the routine of daily practice irksome and longed to be of more active service to his country. He deeply regretted that his nearsightedness prevented him from securing a line officer's commission. It was, therefore, no surprise to his friends that, after joining the Medical Reserve Corps, he gladly responded to a call for volunteers to serve with the British forces in Europe. He served—and in such service gave the best that was in him and his life.

George, or "Peter" Howe, as he was famil-

iarly called, was known to many and loved by all who knew him well. Those who have travelled, hunted, and explored with him can vouch for his courage, resourcefulness and cheerfulness under trying conditions; those who have worked with him in hospital clinics knew his loyalty, integrity, and ever readiness to do even more than his share; those who have played with him knew him as a worthy opponent, a kindly victor, and always a good loser, but only those of us who have lived with him and have known him intimately feel the bitterness of the loss caused by his death. An undemonstrative exterior covered a heart big with real kindness and the spirit of true friendship. To know him a little was to wish to know him well; to know him well was to appreciate his New England common sense, his sterling honesty and his frankness, his keen humor, and his real affection and devotedness to his friends. He died as he lived, loyal and faithful to his duty to the last; he died as he would have wished to die; and we, his friends, gladly, though with sorrow, pay tribute to his memory.

RECENT DEATHS.

NEWELL BLY BURNS, M.D., Assistant Superintendent of the State Sanatorium at North Reading, died of heart disease October 27, 1917, aged 35 years. He was the son of William H. Burns of Melrose Highlands, was a graduate of Harvard College in 1905 and of Harvard Medical School in 1909. He was unmarried. Dr. Burns was a Fellow of the Massachusetts Medical Society.

JAMES D. HEWITT, M.D., of New York, died on November 2, at his home in that city. Dr. Hewitt was born in Boston, a descendant of Governor Thomas Dudley of the Massachusetts Bay Colony. He was graduated from Trinity College in 1854 and spent two years in studying medicine at the University of Pennsylvania. He received his degree in 1858 from the medical department of the University of New York. Upon the outbreak of the Civil War, Dr. Hewitt volunteered as assistant surgeon of the Sixty-sixth New York infantry and won promotion to regimental surgeon with the rank of major. After the war he practised in Boston, but soon afterward returned to New York where he was in active practice for many years.

MARRIAGE.

The marriage is announced of Dr. RUDOLF KATZ of Amsterdam, Holland, and Miss Fanny Bowditch of Boston, at Zürich, Switzerland. Dr. Katz is a neurologist of note and Mrs. Katz is the daughter of the late Professor Henry P. Bowditch of Boston.

ERRATUM.

Error was made in last week's issue in referring to Dr. William J. Robinson of New York as being editor of the *Medical Review of Reviews*. The editor of that publication is Dr. Victor Robinson also of New York.

SOCIETY NOTICE.

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY.—A meeting on "Minor Surgery" will be held at 6 P.M., November 21, at the Harvard Club, Boston.